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The Lancaster Sound Region: 1980-2000

Green Paper

Lancaster Sound Regional Study

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Issues and Options on the Use and Management of the Region

Lancaster Sound Regional Study

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Preface

In the quest for a "best plan" for Lancaster Sound and its abundant resources, this public discussion paper seeks to stimulate a continued, wide-ranging, examination of the issues involved in the future use and management of this unique area of the Canadian Arctic.

The green paper is the result of more than two years of work by the Northern Affairs Program of the Department of Indian Affairs and Northern Development, in co-operation with the government of the Northwest Territories and the federal departments of Energy, Mines and Resources, Environment, Fisheries and Oceans, and Transport. The working group set up to conduct the study first assembled a data base in the form of a data atlas and a series of technical background papers. A synthesis of this information, together with an analysis of the issues, was presented to the public as a draft green paper, released by the Minister of Indian Affairs and Northern Development, the Honourable John C. Munro, at Frobisher Bay in February 1981.

In the months that followed, an extensive public review of the issues involved open meetings in the four Lancaster Sound communities and public workshops in Resolute and Ottawa. These were well attended, and representatives of all interests in the Lancaster Sound area - Inuit, government, industry, conservationists, public interest groups and concerned individuals - provided valuable and necessary contributions in the form of viewpoints, suggestions and criticisms. This feedback is discussed in detail in a recently published report by the workshop chairman, Professor Peter Jacobs, entitled *People, Resources and the Environment: Perspectives on the Use and Management of the Lancaster Sound Region.* All the input received during the public review phase has been taken into consideration in the preparation of the final green paper.

From the beginning of the study, it was expected that to arrive at an overall consensus of the optimum future use and management of the Lancaster Sound region would require intensive public discussion following the release of the green paper. Greatly divergent views held by different sectors of the public will have to be assessed and balanced during this final stage.

To foster this discussion, the green paper presents a series of specific resource use options for Lancaster Sound; it also outlines alternative approaches to a regional planning mechanism. The reaction of the public to these options will have a significant influence on the decisions that the Minister of Indian Affairs and Northern Development and his Cabinet colleagues will make on the region.

There is clearly a need to establish an ongoing process of regional planning for Lancaster Sound that will include meaningful participation by the Inuit residents. The recent initiation by the department of a program for comprehensive land use planning north of

60° is expected to lead to the implementation of such a process in the Lancaster Sound region, and other areas of the North where decisions on resource development activities are urgent. As the details of this program have not yet been put into place, some interim steps are proposed to facilitate the early introduction of effective regional planning.

Public awareness of the complex issues faced in Lancaster Sound and throughout the Arctic has been heightened by the Lancaster Sound Regional Study. Southern Canadians now are more familiar with the concerns of the region's Inuit residents, while the Inuit have had an opportunity to become more knowledgeable of the broader national and international issues bearing on many decisions about the future of the region. The increased familiarity with each others' views and perspectives that this study has given to the different sectors of the concerned public has led to a greater willingness to seek solutions jointly. This greatly improved climate for planning and decision-making should be considered a significant step in the evolution of a "best plan" for the future of this magnificent arctic region.

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Summary

Lancaster Sound, a magnificent part of Canada's high Arctic, poses a great challenge to Canadians in planning for the future uses of the country's natural resources. Ecologically, the Sound is possibly the richest, most productive area in the entire Arctic. It is also the entrance to the Northwest Passage, and is thus a potential transit route for increased shipping if industrial development of any kind proceeds in the Arctic. Since the Sound also has a hydrocarbon potential of its own, important decisions have to be made about the safety of possible oil and gas exploration and development there, as Canada pursues its national objective of energy self-sufficiency. Weighing heavily in the balance of considerations for future uses of Lancaster Sound are the interests of the Inuit who continue to depend on the area's abundant biological resources.

An Environmental Assessment and Review Process (EARP) panel, deliberating on a proposal to drill in the Sound, concluded that a meaningful assessment could not be made in isolation from the broader issues affecting the region. The Minister of Indian Affairs and Northern Development accepted the recommendation that a comprehensive review of these issues be undertaken, and the Lancaster Sound Regional Study was established by the department in conjunction with the government of the Northwest Territories and the federal departments of Energy, Mines and Resources, Environment, Fisheries and Oceans, and Transport.

An interdisciplinary working group, consisting of specialists from the participating departments and several outside consultants, adopted a regional planning approach to identify and analyze the significant issues bearing on the future uses of the region, and to set the stage for comprehensive planning. A detailed data base, summarizing the present state of knowledge of Lancaster Sound as it relates to regional planning, was assembled. It consisted of a data atlas dealing with the region's physical and biological characteristics and renewable resource use patterns and illustrating present and potential industrial and commercial activities. Five background reports, containing 12 individual papers that provided more detailed information on these subjects, completed the data base. A synthesis of this information, together with an analysis of the issues, was produced by the working group in the form of a draft green paper. All material was made available in English, French and Inuktitut.

The purpose of the draft green paper was to stimulate public participation in the identification of issues and the subsequent formulation of options for the planning and use of the Lancaster Sound region. An answer was sought to the question: "What do you believe would be our best plan for Lancaster Sound?"

Release of the draft green paper in February 1981 by the Minister of Indian Affairs and Northern Development was followed by an extensive public review phase with meetings and workshops held in the North and the South. The viewpoints expressed by the public during this phase clarified many issues and re-

sulted in a number of recommendations that have been considered in the preparation of this report. The final green paper is intended to foster continued discussion, focussing on the resource use options presented and the regional planning process.

Concerns and Issues

One of the major concerns identified by the Lancaster Sound Regional Study pertains to the environment and its continued use by the Inuit. The Sound's biological productivity is of global significance and the area will require comprehensive protection measures. The Inuit, fearing the boom-and-bust effects of non-renewable resource exploitation, would prefer a stable economy based on renewable resource use. Inuit are very concerned about the environmental risks of year-round shipping of liquefied natural gas (LNG) and oil, and the possible effects of such shipping on the animals they hunt. Most Inuit oppose further development now, feeling time is needed for social adjustment, the settlement of land claims, and the development of safer technology.

Industry representatives emphasize that not all industrial activities have the same effects on the environment, and that drilling, mining, and shipping are not incompatible uses of the region. They maintain that existing legislative controls are adequate to ensure environmental protection and that social disruption can be prevented by proper planning. Industry believes it is not in the national interest to delay industrial development.

Relative priorities for the delineation and development of Canada's offshore hydrocarbon potential have not yet been established by government, but spokesmen stress that hydrocarbon exploration at any cost has never been its policy.

Much of the public attention focusses on the issues underlying the development and political evolution of the North. In view of the ongoing land claim negotiations, the pace and timing of development is a major issue for Inuit, government and industry alike. Meaningful participation by local people in planning and decision-making and the potentially unequal distribution of social costs and benefits from development are major issues affecting the continued ability of the Inuit to choose their own lifestyle.

Options for Future Use

The green paper presents six alternatives for the future use of the region, based on opinions expressed during the public review. The options range from strict environmental protection to concerted economic development. None of these options has been endorsed by government, industry or the public, and they are presented solely for discussion purposes. For each option a rationale and a description of activities and their implications for the Inuit, the region, and the nation are given and assessed.

The options are:

No new development of any kind, including conservation and renewable resource development, or expansion of existing activities would be permitted for the forseeable future, or until changing social, economic or conservation requirements necessitated re-evaluation of this option.

Protection of the environment and biological resources would be assured before further resource use projects are permitted. A comprehensive strategy matching conservation requirements with appropriate levels of protection would be designed and implemented.

Development of the renewable resource base would support the long-term economic requirements of the Inuit in a manner more compatible with their traditional pursuits and with the protection of the environment.

Development of the Northwest Passage as a year-round shipping route would enable Beaufort Sea and high Arctic oil and gas to be transported to east coast markets. Industrial development in the region would be limited to activities supporting shipping.

Balanced development of renewable and non-renewable resources would be implemented based on careful planning and with due regard for social and environmental impacts.

Non-renewable resource economy giving priority to the extraction and shipping of the region's hydrocar-

bon and mineral resources would be in the national interest and could take place within the context of existing regulatory processes.

Further public discussion following the release of the green paper is expected to lead to a narrowing of these options before they are considered by government.

The Framework of Policies and Initiatives

Canadian sovereignty over the Arctic Archipelago is established under international law and the waters within the islands, including the Northwest Passage, are internal waters under Canadian jurisdiction. Canada has given assurances that passage would not be denied to foreign vessels adhering to Canadian safety and pollution control regulations.

The northern development policy that the government has followed since 1972 seeks to balance the needs and aspirations of northerners, the maintenance of environmental quality and the development of renewable and non-renewable resources, in a manner that is environmentally sound and compatible with both northern and national interests. Effective participation by northerners in the decision-making processes is also an important component. Government departments are developing specific policies and strategies for land use development, environmental management, and the implementation of the national energy policy.

Under the aegis of the Inuit Tapirisat of Canada, the Inuit are currently negotiating a settlement of their comprehensive aboriginal land claim with the federal government and are seeking the creation of a new territory - "Nunavut" - in the central and eastern Arctic. Preliminary discussions on the claim began in the mid-1970s and formal negotiations began in late 1980. Agreement has recently been reached on the wildlife use and management component of the overall settlement. Other issues to be negotiated include land ownership, management and planning; socio-economic development and communications; monetary compensation; and local government.

During the course of the negotiations the Inuit have proposed several interim measures including a three-year moratorium on drilling in Lancaster Sound and an independent inquiry into oil tanker traffic in the Northwest Passage.

Regional Planning

The public review phase demonstrated a clear consensus on the need for an ongoing planning process to guide development according to principles and objectives arrived at with the involvement of local residents and to seek an accommodation between the potentially conflicting goals of development in the national interest and the maintenance of lifestyle choices for the Inuit. Until land claims are settled, Inuit would prefer an interim management board with equal northern and southern representation. Industry, while favouring consultation with northerners, believes that decisions should be weighted toward the national interest. Federal departments and the government of the Northwest Territories support ongoing community-based planning to meet regional goals.

The department's northern land use planning policy is designed to improve the management of lands, offshore areas, and resources, and to resolve resource use conflicts in the northern territories. The details of the planning process and operational structures are now being decided, and public involvement and input is assured.

Various alternatives for a regional planning body for the Lancaster Sound region were suggested in the public review of the draft green paper. In this paper, two widely different options for implementing a regional planning process are put forward to stimulate discussion. It is clear, however, that any planning forum for the region that is eventually adopted must be capable of functioning within the framework of the northern land use planning process.

The first is an interim advisory committee which could be set up expeditiously with its terms of reference established through consultation. This committee, with a substantial proportion of members from the North and an impartial chairman, would be assisted by a planning staff and a technical advisory group. Its mandate could include consulting with all project proponents,

intervening in regulatory hearings, planning workshops, preparing a regional plan and making recommendations to the minister.

The second option, a planning board, would be established under federal legislation and have the authority to prepare and implement a regional plan. The board could pursue comprehensive physical, economic and social planning, and license resource use activities. Its relationship with other regulatory bodies would have to be clarified in the legislation. A planning board would have a broader authority than is contemplated under the northern land use planning program; thus its functional relationship to that program would have to be closely examined.

Some other considerations were identified by the study as germane to planning for the Lancaster Sound region. One was the need to redefine the region's boundaries to reflect more accurately the implications of ecological relationships, renewable resource use patterns, and potential industrial activities.

Planning objectives that strive to balance local, regional and national goals will have to be established at the outset. A set of general principles prepared by a workshop sponsored by the Canadian Arctic Resources Committee in November 1979 could provide the basis for formulating these objectives. They have been endorsed by the region's communities, the Inuit Tapirisat of Canada, and the Baffin Region Inuit Association and have received a considerable measure of general support from government and industry. These tentative planning principles are as follows: to maintain biological productivity and environmental quality; to consider the interrelationships between biological, technical and social concerns in making decisions for formulating policies; to take into account the potential and cumulative impacts of all activities and their interactions in developing management and environmental protection measures; to give northern residents the information and means to exercise their special rights and responsibilities; to provide protection for special areas and some species or components of the ecosystem; to take a regional and long-term management approach; and to include accident prevention or clean-up mechanisms in project evaluations.

There is a great need for a comprehensive identification of ecologically significant areas and habitats, and a process that, operated in conjunction with the land use planning system, would apply appropriate protection. Knowledge is still far from adequate in many areas, one being how renewable resource harvesting could be enhanced to provide a stable long-term economic base for the region.

Beyond the Green Paper

Because a consensus on the optimum future use of the Lancaster Sound region may take some time to reach, six interim steps are proposed to continue the momentum of the green paper exercise and facilitate the evolution of the regional planning regime:

- announcement of a policy statement on the pace and timing of new resource use activities in the region;
- formulation of a comprehensive conservation policy and strategy;
- establishment in the immediate future of an ad hoc advisory committee with involvement of the Inuit residents;
- initiation of an ongoing regional planning process before further project proposals are assessed;
- provision for the modification of the membership and terms of reference of the planning body in accordance with a Nunavut claims settlement; and
- use of the tentative planning principles to evaluate all resource use options for the region.

The views of the readers and the general public on the options presented in the green paper will be vital in determining the overall framework and scope of the regional planning mechanism and its relationship to other processes and events. Arrangements are being made to provide Canadians with the opportunity to respond to the green paper; they will be announced when finalized. Ultimately all information in the green paper and the expression of public opinion will contribute to the decisions on the future uses of Lancaster Sound that must be made by the Minister of Indian Affairs and Northern Development and his Cabinet colleagues.

Supplementary Information

The green paper contains five appendices.
Appendix A describes the physical and biological features, hunting, fishing and trapping patterns, commercial activities, and the socio-economic characteristics of the region. Coloured composite maps to illustrate these characteristics were derived from superimposed maps of individual variables as shown in the data atlas.

Appendix B examines activites that could take place in the Lancaster Sound region during the next 20 years, including year-round shipping, mining, hydrocarbon exploration and development, establishment of parks and reserves, and community-based tourism.

Appendix C itemizes existing projects and current proposals for shipping and non-renewable resource exploitation, including hydrocarbons and minerals.

Appendix D describes the organization and methodology of the Lancaster Sound Regional Study and lists participants.

Appendix E provides a list of the supporting documents, including the reports and transcripts of meetings and workshops from the public review phase.

Contents

I. Introduction

Lancaster Sound, a magnificent part of Canada's high Arctic, poses a great challenge for Canadians in planning for the future uses of the North. Ecologically, the Sound is one of the richest, most productive areas in all the Arctic. The long-term health of this special, indeed unique, environment should be of concern to all Canadians. Lancaster Sound forms the eastern entrance to the Northwest Passage, and thus is part of a potential transit route for increased shipping if industrial development of any kind proceeds in the Arctic. Since the Sound also holds a hydrocarbon potential, important decisions have to be made about the implications of possible oil and gas exploration and development here as Canada pursues its national objective of energy self-sufficiency. Weighing heavily in the balance of considerations for the future use of Lancaster Sound are the interests of the Inuit who live in the area and continue to depend on its biological resources. Thoughtful comment received from the readers will assist government in reaching sound decisions in regard to the future of the Lancaster Sound region.

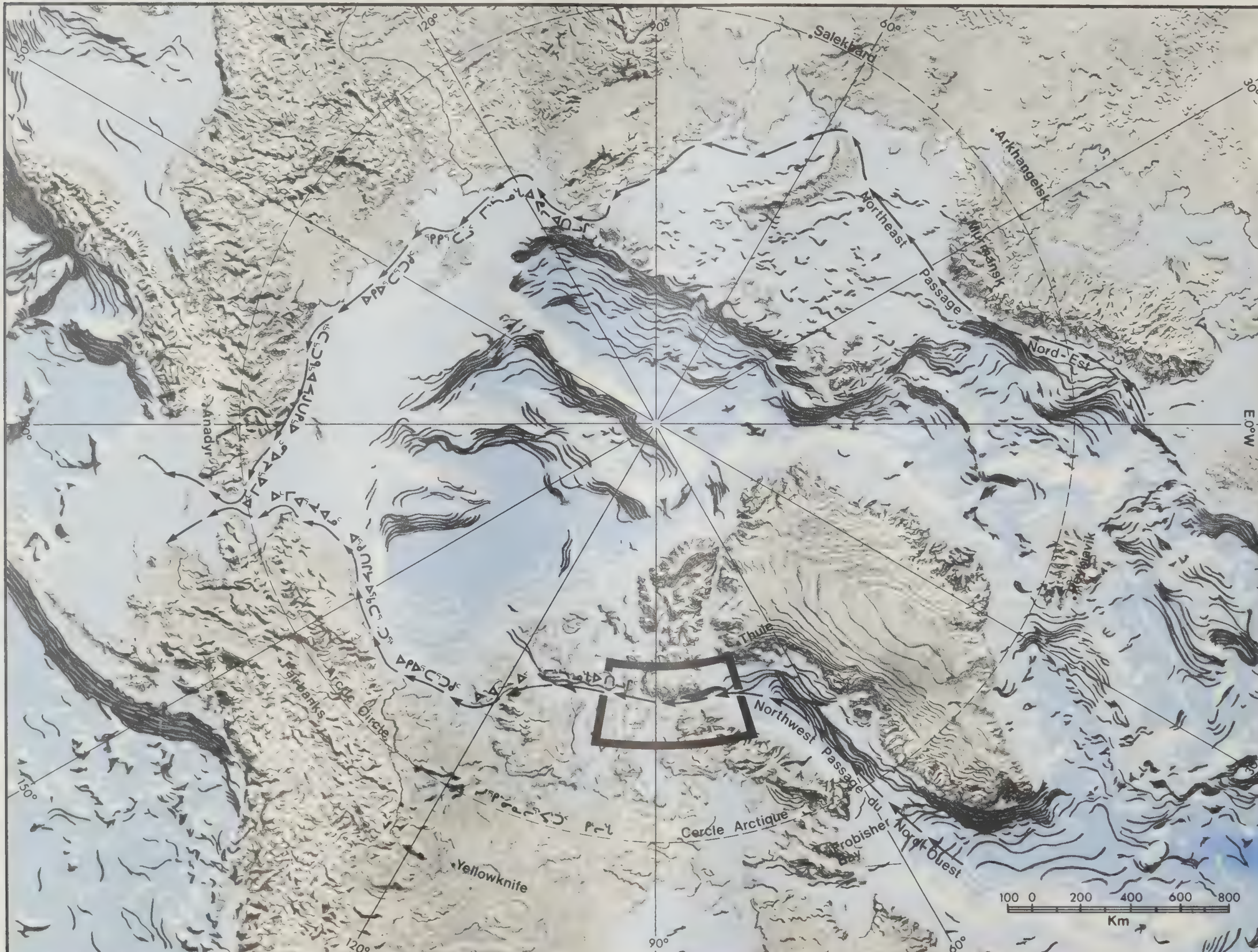
The Area and Its Significance

Lancaster Sound is situated approximately 3 000 km north of Montreal. A deep marine channel on the north side of Baffin Island, it is an important geographical feature of the circumpolar Arctic (Figure 1). Four hundred kilometres long and 75 to 120 km wide, with a flaring mouth open to Baffin Bay on the east, the Sound forms a major passage into the Canadian Arctic Archipelago. On the west, the Sound is connected to Barrow Strait and the network of straits and passages of the Arctic Islands.

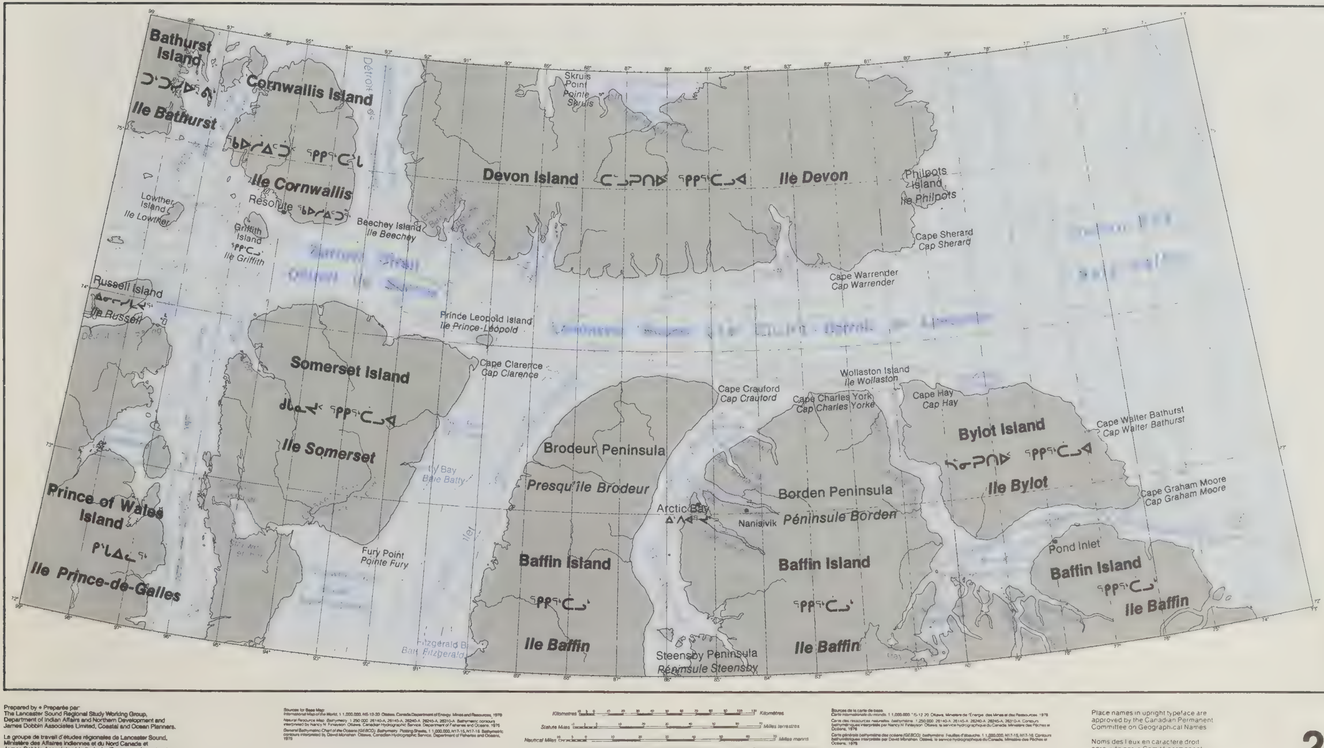
The study area, as defined for this regional study, is shown in Figure 2. It is centered on Lancaster Sound and Barrow Strait, and includes the adjoining marine channels and inlets as well as the coastal zones and uplands of Bylot, Cornwallis and Little Cornwallis islands, portions of Devon and Somerset islands and Baffin Island's Brodeur and Borden peninsulas. The total extent of the study area is 260 000 km². The communities of Pond Inlet, Arctic Bay and Resolute and the mining complex of Nanisivik are situated within the region.

Lancaster Sound and the contiguous channels and inlets have been recognized by scientists as critical to the reproduction and survival of the seabird population in the Canadian high Arctic; the Sound is considered to be one of the most important marine mammal habitats in the eastern Arctic as well. Several million seabirds nest, reproduce and feed in the Sound during the summer months. Species concentrations are unrivalled anywhere in the high Arctic and include northern fulmar, glaucous gull, black-legged kittiwake, thick-billed murre and black guillemot. Marine mammals include 85 per cent of North America's narwhals and 40 per cent of the white (beluga) whales in addition to large populations of ringed, harp and bearded seals. There are small colonies of walrus, and the endangered bowhead whale still occurs in small numbers throughout these waters. Polar bears are found in large numbers on the ice.

Significance of the Lancaster Sound Region in the Context of the Circumpolar North • ᖃᓄᕐ ᑕᓪᓗᕈᑕᐅᒃ ᖃᐅᔨᓴᕐᑕᐅᓂᐊᑕ ᐱᒻᒪᕐᑎᒪᐅᓂᐊ ᐅᕐᑭᐅᕐᑕᕐᑐᓂᒫᕐ ᐃᓯᒪᒥᓪᓗᒍ • Importance de la région du détroit de Lancaster dans l'ensemble du Nord circumpolaire



The Study Area • ᖃᐅᔨᓴᕐᕕᐅᔪᖅ • La région d'étude



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Le groupe de travail d'études régionales de Lancaster Sound,
Ministère des Affaires indiennes et du Nord Canada et
James Dobbin Associates Limited, planificateurs, côtes et océans.

Sources for Base Map:
International Map of the World, 1:1,000,000, NS-12-20. Ottawa, Canada Department of Energy, Mines and Resources, 1978
Natural Resource Map. Bathymetry. 1:250 000. 26140-A, 26145-A, 26240-A, 26245-A, 26310-A. Bathymetric contours interpreted by Nancy N. Finlayson. Ottawa, Canadian Hydrographic Service, Department of Fisheries and Oceans, 1976
General Bathymetric Chart of the Oceans (GEBCO). Bathymetry. Plotting Sheets, 1:1,000,000, N17-15, N17-16. Bathymetric contours interpreted by David Monahan. Ottawa, Canadian Hydrographic Service, Department of Fisheries and Oceans, 1979

Sources de la carte de base:
Carte internationale du monde, 1:1,000,000, NS-12-20. Ottawa, Ministère de l'Énergie, des Mines et des Ressources, 1978
Carte des ressources naturelles, bathymétrie, 1:250,000, 26140-A, 26145-A, 26240-A, 26245-A, 26310-A. Contours bathymétriques interprétés par Nancy N. Finlayson. Ottawa, le service hydrographique du Canada, Ministère des Pêches et Océans, 1976
Carte générale bathymétrie des océans (GEBCO), bathymétrie. Feuilles d'ébauche, 1:1,000,000, N17-15, N17-16. Contours bathymétriques interprétés par David Monahan. Ottawa, le service hydrographique du Canada, Ministère des Pêches et Océans, 1979

Place names in upright typeface are approved by the Canadian Permanent Committee on Geographical Names

Noms des lieux en caractère droit approuvés par le Comité permanent canadien des noms géographiques

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The abundance of biological resources, particularly the marine mammals, which are so important to the Inuit way of life, is best understood by considering the marine region surrounding Lancaster Sound. Figure 3 places the study area within the context of the eastern arctic marine region centered on northern Baffin Bay and including the west coast of Greenland, the North Water, Jones Sound, and the coast of Baffin Island. The predominant areas of open water, including polynyas and shorelands, are illustrated on this map along with the generalized pattern of surface currents.

A polynya is a recurring area of open water surrounded by ice, which is caused by various combinations of currents, tides, upwellings and winds. The North Water is the most famous polynya because of its size, persistence and northerly location. A smaller, less persistent polynya opens early in the arctic summer near the mouth of Lancaster Sound. Important shoreleads develop along the west coast of Greenland, the south coast of Devon Island, and in the vicinity of Bylot Island.

The upwelling and mixing associated with ice edges and open-water areas contributes to the production of an abundant source of food for marine mammals and migrant seabirds and provides them with refuge. Many of the marine mammals are not permanent residents of Lancaster Sound, but spend a portion of each year in other polynyas or shoreleads in the Baffin region. The occurrence of open water early in the summer is extremely important for attracting marine mammals back to Lancaster Sound and for the arrival of seabirds.

The coastal zones, mountains and upland plateaus of the islands also contribute to the region's biological richness with populations of snow geese, caribou, muskoxen, and other species. This abundance of marine and terrestrial animal life has provided food and shelter for the Inuit for several thousand years. Wildlife continues to be important to the Inuit residents of Arctic Bay, Pond Inlet, Resolute and the small settlement of Grise Fiord on southern Ellesmere Island, providing them with food as well as cash income. A more detailed description of the character of the Lancaster Sound region is provided in Appendix A.

Strategies to protect at least part of this unique area are being considered by Canadian and international conservation agencies. Parks Canada has identified various natural areas of Canadian significance, at least one of which will likely be proposed for national park status. A number of locations of particular ecological importance have also been proposed for protected status by the International Biological Programme (IBP). On the international scene also, two sites in the Sound are possible candidate areas for inclusion on the list of world heritage sites, which are selected by the United Nations Educational, Scientific and Cultural Organization (UNESCO) from nominations by member countries. They are the eastern entrance to Lancaster Sound and Prince Leopold Island. Finally, the International Union for the Conservation of Nature and Natural Resources (IUCN) has identified as a high priority in its recent World Conservation Strategy the establishment of protected areas in the Canadian "tundra and barren arctic desert," including the Lancaster Sound region.

In addition to concerns about the protection of its magnificent scenery and abundant animal life, the Lancaster Sound region has become significant in ways that may well affect the lives of all Canadians. The Sound forms the eastern entrance to the Northwest Passage, a corridor of navigable water connecting the Atlantic and Pacific oceans, which was first explored by Europeans during the nineteenth century. Ships have used the Sound for more than 150 years, beginning with the European explorers, followed by whalers and traders and, more recently, by supply ships, scientific vessels, and ore carriers. However, all these vessels have been forced to limit operations to the short open-water season, extending from mid-July to late October. Now, with the current crisis in the world energy situation and Canada's determination to regain self-sufficiency in oil supplies, this situation may change radically.

An industry proposal calling for the year-round shipping of liquefied natural gas (LNG) in powerful ice-breaking tankers from Melville Island through Lancaster Sound to eastern Canada is under review.

Northern Baffin Bay and the Study Area · ᐃᒫᓄᑦ ᖃᐅᔨᓴᖅᐱᐅᔪᐊᕐᓄ · Partie nord de la Baie Baffin et la région d'étude

General Direction of Surface Flow • ᐃᒪᐅᒃ ᖃᖓᑕ ᐃᖏᕋᓂᖓ • Direction générale des courants de surface

Median Amount of all Ice: June 4 • ᓯᑯᖃᕐᓂᖓ: ᔪᓂ 4 • Quantité moyenne de toutes glaces: le 4 juin

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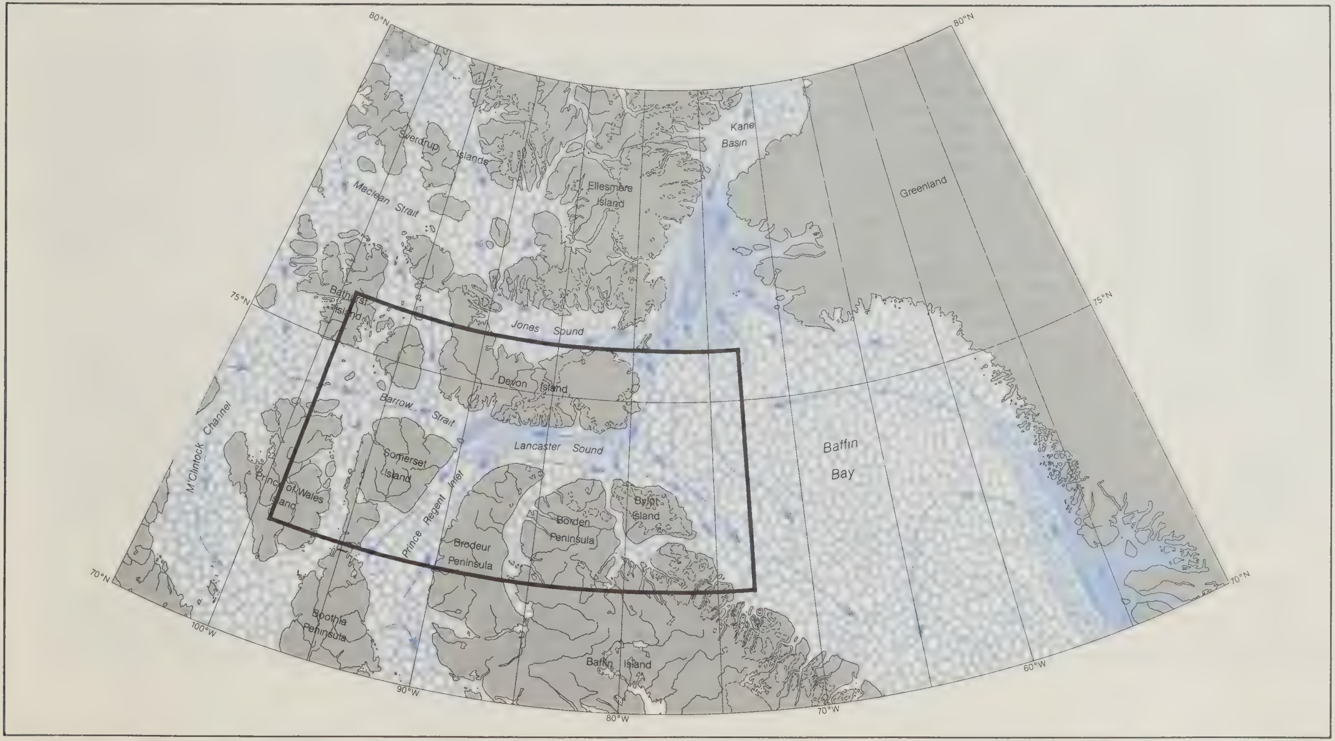
9/10 - 10/10 Ice Cover • 9/10 - 10/10 ᓯᑯᖃᕐᓂᖅ • 9/10 - 10/10 Couverture de glace



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Ministère des Affaires indiennes et du Nord Canada et
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Scale in Kilometres
100 0 100 200 300

See map description for information sources • Voir les descriptions des cartes pour les sources d'information

3

Very large ice-breaking tankers are also being considered for carrying crude oil and liquefied natural gas from the Beaufort Sea through the Northwest Passage to refineries on the east coast of Canada. It has been estimated that before the end of the century, ship traffic in the Sound could increase from the present level of about one ship per day during the short open-water season to three ships per day year-round.

As well as being a possible route for the transport of oil and gas from points farther west, Lancaster Sound has a hydrocarbon potential of its own. A number of promising geological structures have been identified in the Sound and in the adjacent part of Baffin Bay. Although the government has withheld approval of the initial application for permission to drill an exploratory well, further proposals are under preparation. Exploration and subsequent development of the reservoirs that may be discovered would have a significant influence on the Lancaster Sound region and its Inuit communities through the construction of onshore installations and ports, the presence of a relatively large work force, and the threat of a blowout or large oil spill. Further detail on potential and future uses of Lancaster Sound is given in Appendices B and C.

Clearly, each of these potential developments would bring definite impacts to the natural environment of the region and would affect the lives of the Inuit residents whose lifestyle has already undergone rapid changes during the past half century. These non-renewable resource developments would also bring economic benefits to the residents of the region, the Northwest Territories, and to Canada as a whole. However, the implications of such development cannot be fully assessed until a detailed examination of all the regional, territorial and national costs and benefits is carried out.

The Study

The present study evolved from the public hearings held in 1978 to examine an application by Norlands Petroleums Ltd. for permission to drill an exploratory well in Lancaster Sound. The panel of officials set up under the federal Environmental Assessment and Review Process (EARP) to conduct the hearings concluded that a meaningful assessment of the environmental and socio-economic impacts of exploratory drilling in Lancaster Sound could not be made in isolation from the broader issues that affect all uses of the area. The panel therefore recommended that a comprehensive review of the complex resource use problems in the Lancaster Sound region should be done by the Department of Indian Affairs and Northern Development as the principal federal co-ordinating and planning body for the North. This recommendation was accepted by the Minister of Indian Affairs and Northern Development.

Accordingly, in the fall of 1979 the Lancaster Sound Regional Study was initiated by the Northern Affairs Program of the Department of Indian Affairs and Northern Development in collaboration with the federal departments of Energy, Mines and Resources, Environment, Fisheries and Oceans, and Transport, and with the government of the Northwest Territories. The organization of the study is described in Appendix D. At the outset it was decided that a green paper[1] would be prepared to serve as a tool to bring about organized and thorough discussion by the residents of the Lancaster Sound region, interested organizations, and concerned members of the public on the complex issues of determining the optimum future uses of the region's marine and land areas.

In a message to the Baffin Regional Council, dated October 17, 1979, the Minister of Indian Affairs and Northern Development explained that the green paper was not intended as a "blueprint for development" of the Lancaster Sound region, but rather, as a means of initiating public discussion on how the region should be managed in future. He spoke of the variety of uses the region might accommodate and noted that some might be incompatible with each other or with the environment. He also referred to the importance of preserving the traditional culture and way of life of the

[1]The term *green paper* is generally used to refer to a paper prepared by government for the purpose of fostering full public discussion of a specific issue or policy question. Thus, a green paper is intended to provide a clear description of the issue in question and to outline a range of possible alternatives or options available for its resolution.

Inuit who live there and stated that factors such as environmental protection and oil and gas must be considered. The minister stressed that a clear perception of the issues involved was needed so that informed decisions could be made on the use and management of Lancaster Sound.

The paper, therefore, does not provide a regional plan for Lancaster Sound; rather, it lays a foundation for a regional planning process. It strives to facilitate land and marine use planning and decision-making by the appropriate organizations, whether federal, territorial or local. Neither is it an environmental impact assessment - such assessments are being completed on a project-by-project basis under the existing Environmental Assessment Review Process. The paper does, however, provide the background necessary to gain a regional perspective on alternative uses and an insight into their cumulative effects.

As the foundation for a comprehensive regional planning process for Lancaster Sound, the green paper and associated study reports provide a summary of existing knowledge on the physical and biological environment, the current socio-economic situation, and the range of current and potential uses of the study area. The paper also puts forward, for discussion, some alternative strategies or options that appear to be available for the use, development and management of the region for the remainder of the century.

The Lancaster Sound Regional Study comprises three main phases, the first of which involved the compilation of all relevant available information on the region and the preparation of a preliminary data atlas and background reports (see Appendix E). A summary of the data base, analysis of interactions, and key questions about future directions that the region may take, were incorporated into a draft green paper. This document then served as the primary vehicle for the second phase of the study, the public review phase.

The second phase consisted of public meetings in the region's four communities, followed by two workshops in Resolute and Ottawa. The public review phase produced much valuable input from all interested sectors of society - perspectives, viewpoints and insights that will help to build a strong foundation for planning and decision-making on the future of the region.[2]

The third phase consisted of updating the data base and drafting the final green paper, taking into consideration all input from the public review phase. It is hoped that the green paper will provide the information needed to make decisions now and in the future concerning the use and management of the Lancaster Sound region and will be the foundation upon which to build further knowledge of this area.

[2]P. Jacobs. 1981. *People, Resources and the Environment: Perspectives on the Use and Management of the Lancaster Sound Region.* Department of Indian Affairs and Northern Development.

II. Concerns and Issues

The Canadian public has had an opportunity to consider potential and future uses for the Lancaster Sound region, as outlined in the draft green paper. (These uses are included in the present paper as Appendix B.) Industry, government, Inuit, special-interest groups and individual citizens considered these potential and future uses and the possible directions that development might take, and expressed their opinions and concerns at public meetings in the four communities of the region, at two formal workshops (one in Resolute, one in Ottawa) and by letter. Comments thus provided concerned the draft green paper itself, the background materials and the study approach in general. The input from the public covered a wide range of perspectives and values, with each sector expressing its own interests and concerns. A synthesis and analysis of these views is included in the report prepared by Professor Peter Jacobs, who chaired both the Resolute and Ottawa workshops.[1]

Major Concerns

Protection of the Environment

The public has expressed consensus that Lancaster Sound has special biological characteristics that make it unique and that some areas, important for wildlife or for historical or cultural significance, require immediate protection. Some proposed that because Lancaster Sound has much more than just a regional or national environmental significance, a global perspective is needed on the protection of the region.

All sectors of the public support the establishment of a national park in the region, although some industry representatives, recognizing that non-renewable resource extraction activities are not permitted within a national park, feel that areas having exploitable mineral or hydrocarbon resources should not be included in a park. Industry is of the opinion, therefore, that all interested parties should participate in the determination of boundaries for any national park. Inuit support the establishment of a national park reserve, with the reserve becoming a park after land claims are settled. Tourism would increase and the types of employment opportunities available would be more compatible with their preferred lifestyle.

Environmental interest groups maintain that protection of the region's environment should not be limited to the boundaries of a national park and express concern about the small size of the area currently proposed for protection under the National Parks Act, namely the Bylot Island-Eclipse Sound area. A comprehensive strategy for conservation in the region was seen by some as a means of ensuring protection of the wildlife of the region. This comprehensive strategy would concentrate initially on identifying the levels of protection needed for all habitats in the region, independent of present conservation interests and proposals. The appropriate mechanisms for ensuring that these resources be given adequate protection could then be implemented.

The Arctic is seen by many as an important component of the global physical system in which only "no-risk development" should be permitted. A recommendation was made to follow a tenet of the World Conservation Strategy[2] in planning for Lancaster Sound, specifically that "conservation is a process — to be applied cross-sectorally — not an activity sector in its own right."

Stable Regional Economy

Those residing in the region are concerned about premature industrial development causing a "boom-bust" effect on the regional economy and would like to have the opportunity to examine alternative activities before embarking on new industrial development.

The Inuit are interested in making tourism a major activity in the region. They recognize that tourism businesses require much less capital investment than do non-renewable resource development activities, and

[1] P. Jacobs, 1981. *People, Resources and the Environment: Perspectives on the Use and Management of the Lancaster Sound Region.* Department of Indian Affairs and Northern Development.

[2] International Union for the Conservation of Nature. 1980. *World Conservation Strategy: Living Resource Conservation for Sustainable Development.*

that tourism will therefore provide many opportunities for small businesses and increased wage-employment in activities compatible with the Inuit traditional lifestyle. There is much support for this view. Many think that tourism, through the provision of more jobs in businesses controlled by Inuit, will complement the present lifestyle and provide long-term economic benefits. Others believe that consciously promoting tourism in the region within the context of strengthening the renewable-resource-based economy could provide the improved economic base desired by the Inuit. The government of the Northwest Territories feels that tourism can enhance the economy of the region without depleting its natural resources.

Concerns have been expressed, however, over the effects that poorly controlled tourism may have on the wildlife of the region, as well as on archaeological and historic sites. Some hold the opinion that tourism planning and parks planning must be done simultaneously. The current seasonality of tourism in the region is also of concern, with most activities being concentrated in July and August. High transportation costs to the region have been mentioned as an inhibiting factor.

Non-renewable Resource Development

Most Inuit oppose further industrial activity in the region at this time. They say that they have not had time to prepare for such large-scale developments and that adequate environmental safety measures have not been proven. Also they believe strongly that land claims should be settled before more industrial projects are approved.

Representatives of industry, on the other hand, think that exploratory drilling, mining and year-round shipping are all compatible uses of the region. They emphasize that not all industrial activities require the same services or level of support, or have the same effects on the environment. Industry maintains that adequate legislative controls are already in place to ensure that acceptable environmental conditions are maintained and that proper planning now will prevent the social disruption feared by many. Industry's position is that it would not be in the national interest to unduly delay industrial development of the region.

Government stresses that it has never been its policy to pursue exploration for oil and gas at any cost. The Department of Energy, Mines and Resources has clarified its "need-to-know" policy as it relates to Lancaster Sound to state that "we would like to know whether it contains commercial fields of oil and gas but we do not need to know immediately."[3] This is clearly contrary to the positions expressed by some in industry who feel it is imperative that major industrial development in Lancaster Sound proceed soon.

[3]J.P. Hea. Submission on Behalf of the Department of Energy, Mines and Resources. Lancaster Sound Regional Study Workshop, Ottawa, May 1981; 4 p (LSRS Open File No. S-05).

Government and all sectors of the public recognize that Inuit in the region feel threatened by the immediacy of development initiatives, and agree that regional planning must consider the social effects of industrial activities and the desire of the Inuit to participate at all levels in developments that take place.

Of the various industrial proposals, the Arctic Pilot Project, which would involve the shipping of liquefied natural gas through the Northwest Passage, is of most immediate concern to the people of the region. Inuit, particularly those of Resolute, are worried about the safety of such year-round shipping and the effect that the ships' tracks through the ice will have on their hunting patterns. Of greater concern than the effects of the APP, is the year-round shipping of oil, a potential pollutant. Inuit fear such shipping will follow the commencement of the APP, before that project can be properly assessed. Inuit, environmental-interest groups and others want assurances that experience in year-round shipping will be gained first from a pilot project that is properly evaluated before approvals for transportation of a pollutant cargo such as oil will be considered.

Issues

The public directs much of its attention, not to the specific project proposals, but to the much broader issues underlying northern development and political evolution in the North. In view of the ongoing land claim negotiations, the pace and timing of industrial

development is a major issue. Local participation in decision-making and in controlling the future of the region is also an issue of importance, as is the distribution of costs and benefits that would accrue from any developments taking place in the region. Freedom to choose a lifestyle is also a fundamental issue.

These issues are not new, nor are they unique to Lancaster Sound; they have been raised in relation to proposals elsewhere in the North. Nonetheless their consideration at this time is made urgent by the nature and scope of the proposals for Lancaster Sound and the speed with which industry is hoping to initiate specific projects.

Opinions on these issues are varied. Different segments of the public consider the issues from different perspectives, from global, through national and regional, to local. Balancing these various perspectives, although difficult, is crucial if a consensus on development in the region is to be arrived at.

Pace and Timing of Development
Inuit are concerned that industrial projects have been and continue to be approved before the settlement of land claims. Objections to this have been expressed by individuals, community councils, and the regional and national Inuit organizations, the Baffin Region Inuit Association and the Inuit Tapirisat of Canada. The Inuit recognize that non-renewable resource development projects initiated prior to the settlement of land claims will not be subject to the terms of a land claim agreement when such is made; thus Inuit will be in no position to exert effective control over those projects or to receive maximum benefits from them. Their position is, therefore, that no new industrial projects should be approved until land claims are settled.

The government position on this issue is that the settlement of land claims in a just and equitable fashion is already a priority of the government of Canada. (See Chapter IV for further detail on the land claims process.) Because the government also has a number of other priorities, however, it has proceeded to make decisions on certain activities in Lancaster Sound while land claim negotiations are still in progress.

Industry reacts to suggestions that there should be no new industrial activities approved before land claims are settled with pragmatic statements of its own concerns, specifically that scheduling for such large-scale projects demands tangible, realistic time frames to allow for proper planning, and that nebulous time indicators such as "when land claims are settled" are of no value to them in their project planning. All sectors of the public express the hope that land claims will be settled in a just manner and that development in the region will then be able to proceed at a pace acceptable to all parties. However, in the opinion of various spokespeople, it is not possible or desirable to postpone the initiation of planning for the region's future until a final agreement on land claims is reached.

Most people in the region feel they do not have educational levels necessary to derive maximum benefits from the opportunities that will be presented when industrial projects eventually go ahead. Future job opportunities need to be identified and training programs offered to prepare residents; considerable lead-time is needed for this. The Inuit want to see new industrial development in the region postponed to enable this preparation; however, industry believes that appropriate training programs can be designed in conjunction with development.

Participation and Control
Inuit express a desire to participate actively and meaningfully in the making of decisions affecting their future. Accordingly, they state that membership on advisory committees is not sufficient to allow them to achieve their goals, and they demand a role in all structures having authority to make decisions on the future of the region. They want input into the formulation of government policies for the North, representation on any planning and management boards that may be established to control development in the region and, in particular, a strong regional voice in any body set up to regulate year-round shipping through Lancaster Sound.

The public generally supports the demand for effective participation by the people of the region, although industry and government are concerned lest Inuit think they will be allowed the right to veto proposed pro-

jects. Petro-Canada, in a statement representative of industry's position on this issue, asserts that local people need to be involved to the degree that reflects their interest in and dependence on the study area.

Many of the demands that Inuit are making for control will de dealt with in the land claim negotiations. In the interim, there is general agreement that a framework must be devised through which legitimate demands can be met.

Distribution of Costs and Benefits

Industry maintains that development of the non-renewable resources of the Lancaster Sound region is in the national interest, because it is one step in achieving energy self-sufficiency for the nation. Inuit accept the importance of the national interest, but at the same time point out that there are major inequities in the distribution of the costs and benefits accruing from these activities in the North. They assume that southern Canadians will derive most of the economic benefit from industrial activities in the region - profits will flow to southern-based companies and skilled, transient workers will come North to take temporary, high-wage jobs for which local residents are untrained. Although residents of the region will derive minimum economic benefits from these projects, the social costs are likely to be borne almost entirely by them.

Industry and government respond to these observations by outlining the steps they intend to take to prepare communities for the advent of industrial development. These include designing and implementing training courses, counselling workers and students, providing incentives and assistance to local businesses, and making a determined effort to understand the aspirations of the region's residents. Despite the apparent good intentions of industry and government in this regard, Inuit remain skeptical that the results of industrial development in the region will be anything but what they fear — economic benefits flowing southward, with social costs being borne by the region's residents.

Choice of Lifestyle

Hunting, fishing and trapping continue to be important sources of income and food in all communities in the region. Although many Inuit are employed as wage earners, almost all engage to some extent in hunting, fishing and trapping, which they consider important for their survival as Inuit. The maintenance of a "country-food" diet is also deemed essential for their well-being. For these reasons they oppose projects that could cause changes in migration patterns and population sizes of the animals they harvest — changes that may threaten or restrict their ability to follow their preferred lifestyle. Though not advocating a return to the land for everyone, they want the option to choose between a wage-earning lifestyle and one dependent on hunting, or a combination of the two. An appropriate educational system including opportunities for technical or managerial training will be necessary if the residents of the region are to be able to participate in the wage-earning economy at levels concomitant with their aspirations.

Industry believes that it is possible to have major industrial projects in the region with minimal disruption of wildlife populations and Inuit hunting patterns. In responding to the expressed desire for training programs to better prepare Inuit to participate in the wage economy, industry says that there should be extensive consultation with the communities in order that appropriate training programs may be offered. Industry reiterates, though, that to postpone hydrocarbon projects would not be in the national interest and that development and training can proceed simultaneously. In the opinion of spokespeople for industry, work schedules for employees can be designed in ways that allow Inuit workers to combine wage employment with hunting, fishing and trapping.

III. Options for Future Use

The draft green paper asked Canadians: "What do you believe would be our best plan for the Lancaster Sound region?" The public review of the draft green paper revealed a wide range of views and perspectives on the future of the region, in keeping with the varied interests of the different sectors of the public. This chapter presents a delineation of six possible alternatives based on this public expression. These options need not be the only ones to be considered at this time; however, it is believed that they do encompass the full range of public opinion expressed during the public review phase. The options, outlined below, range from strict environmental protection of the region to full-tilt economic development. They have not yet received endorsement from the public, government or industry, and are presented here solely to stimulate discussion. In this way, it is hoped to involve all parties in a meaningful process of narrowing down the choices for the future of the Lancaster Sound region.

Resource Use Option 1: No New Development

Basic Premise
No new development of any kind should be entertained for the Lancaster Sound region.

Rationale
The Inuit have stated that resource development activities have placed a strain on the social fabric of their communities and that they need time to adjust to recent developments. The Inuit Tapirisat of Canada (ITC), Baffin Region Inuit Association (BRIA) and the communities have called for a moratorium on both renewable and non-renewable resource development activities until land claims are settled.

Description of Activities
According to this scenario, no new development activities would be permitted for the region. Project proposals, including those involving year-round shipping by Canadian carriers, would not be considered. No new resource exploration would be permitted and existing resource extraction and harvesting projects would not be allowed to expand. New park or conservation areas would not be established.

Implications
The "nothing-new" option would ensure that land claims negotiations were not adversely affected by new developments and would give the Inuit some time to clarify their goals for the future. This option probably could not be effective for an extended period of time and would have to be periodically re-evaluated in terms of the growth of the human population and future socio-economic and conservation requirements. The interests of the National Energy Program and the non-renewable resource industry, both domestic and foreign, would not be well served by this option. As well, the Canadian government has previously indicated that foreign shipping would not be denied access to the Northwest Passage.

Resource Use Option 2: Environmental Protection

Basic Premise
Protection of the environment and the biological resources of the Lancaster Sound region should be assured before any resource use projects are permitted.

Rationale
Lancaster Sound is characterized by an abundance of marine life that makes it unique in North America and probably the circumpolar Arctic. The reasons for this high biological productivity remain poorly understood. As detailed in Appendix A, the marine birds and mammals inhabiting the Sound comprise major portions of the North American and world populations of species such as narwhal, white (beluga) whale, northern fulmar, kittiwake and the endangered bowhead whale. The eastern entrance to Lancaster Sound acts as a funnel that concentrates migrating seals, walrus, whales and marine birds. The native people of the Lancaster Sound region, the west Greenland coast, and the Baffin and Labrador coasts depend on the marine resources of Lancaster Sound to support their way of life and their "country-food" diet.

There are a number of particularly important or biologically sensitive sites within the region, which are unprotected at this time. Parks Canada is interested in establishing a national park reserve within the region, and the entire Lancaster Sound area appears to satisfy the criteria for world heritage designation under

UNESCO's Convention for the Protection of the World's Cultural and Natural Heritage. The Sound also lies within a "high priority" zone for protection as outlined in the World Conservation Strategy.[1] If petroleum exploration and production is permitted in the Sound and if the shipment of oil through the Northwest Passage takes place, then the potential for oil spills will exist: the environmental consequences of a large spill could be catastrophic. It may be argued that the government of Canada has a moral responsibility to the Inuit, to the nation, and to the world to ensure that an environmental catastrophe does not occur. A country as resource-rich as Canada should be able to assure the protection of this biologically important marine region.

Description of Activities
The initial step in this option would be the design of a comprehensive conservation strategy for the region. All habitats would be evaluated, and individual requirements for environmental protection examined. The entire marine ecosystem would also be evaluated, including the linkage between Lancaster Sound and the North Water polynya. The strategy would include implementation proposals matching conservation requirements with the appropriate type of protection, such as world heritage site, marine sanctuary, national park reserve, national landmark, national wildlife area, migratory bird sanctuary, or territorial wildlife preserve. The proposed comprehensive conservation strategy would be subject to public review and comment before being submitted to government for approval. Finally, the required legislative action would be taken to conserve and protect the biological resources of Lancaster Sound.

According to this scenario, no new resource use activities would be permitted until the comprehensive conservation strategy was implemented. Subsequently, resource use activities that demonstrated their compatibility with the conservation strategy would be considered. Exploratory drilling in the Sound and the shipment of oil through the Sound in year-round icebreaking tankers would be unacceptable for the forseeable future. An LNG shipment project of a limited scale and along closely monitored routes might be permitted.

Implications
The environmental protection option would greatly enhance Canada's international stature as a protector of the arctic environment. It would increase the government's moral and environmental credibility with a large proportion of the Canadian population and minimize negative impacts on the preferred lifestyle of the Inuit while safeguarding their future opportunity to choose among lifestyle options. On the other hand, some Inuit may see this option as a permanent restriction on resource development following the settlement of land claims and a possible restriction on hunting (which may have to increase as the human population increases). The environmental protection option would not be in keeping with the goals of the National Energy Program and the non-renewable resource industry.

Resource Use Option 3: Renewable Resource Economy

Basic Premise
The renewable resources of the Lancaster Sound region should be developed to support the longer term economic requirements of the Inuit.

Rationale
Inuit have depended upon the renewable resources of Lancaster Sound throughout their history. The introduction of non-renewable resource projects in recent years leaves them with little control over the pace of development, and now appears to threaten the region's renewable-resource-based economy as well. Strengthening of this renewable-resource-based economy could supply the Inuit with an improved economic base, thus aiding them to regain control over their own destinies.

Description of Activities
Many aspects of the environmental protection option 2

[1]International Union for the Conservation of Nature. 1980. *World Conservation Strategy: Living Resource Conservation for Sustainable Development.*

would also be included in this option. The Bylot Island-Eclipse Sound national park reserve would be established, and a conservation strategy implemented to preserve important species and sites.

Hunting, fishing and trapping activities would continue, and improved resource management practices would be introduced where feasible to increase potential yields. Renewable resources would be exploited on a sustainable basis to provide country food as well as products to be marketed for economic gain. The national park and the wilderness resources throughout the region would be used to promote tourism, and appropriate community services would be developed to support the tourism industry.

Exploratory drilling for oil and gas in Lancaster Sound and the year-round shipment of oil through the Sound in ice-breaking tankers would not be acceptable. LNG shipments might be permitted, but only on an experimental basis along closely monitored routes. Mining exploration and development would generally not be permitted, but might be considered for areas identified as having low biological productivity.

Implications
The renewable resource economy would take some time to develop. Such development would, however, have the combined advantage of preserving important components of the environment and of using more fully the biological resources of Lancaster Sound. The opportunity for Inuit to pursue a traditional lifestyle would be maintained. In addition, an economy based on what already exists in the region could be built. On the other hand, exploitation of hydrocarbon resources in support of the National Energy Program would not be possible with this option.

Resource Use Option 4: Northwest Passage Shipping

Basic Premise
Non-renewable resource development in the Lancaster Sound region should be limited to local actions necessary to support the development of the Northwest Passage as year-round shipping route.

Rationale
Some believe the biological resources of the Lancaster Sound region are too important to endanger them by exploratory drilling; others that the Inuit way of life should not be endangered through non-renewable resource development projects within the region. However, it is also clear that the national energy requirements cannot be ignored, and accordingly some propose that Canada must develop the Northwest Passage as a year-round shipping route in order to move urgently needed oil and gas from the Beaufort Sea and the high Arctic to east coast markets. Development of the sea route can be initiated on a phased experimental basis until shipping technologies and environmental controls are deemed adequate for full development.

Description of Activities
According to this option, the Arctic Pilot Project (APP) would be approved as proposed, and its implementation and operation closely monitored over several years. The Department of Transport would proceed to develop the necessary services to support year-round shipping, including navigational aids, a vessel traffic management system, pollution control and clean-up systems, and ice-breaking support services.

An advisory committee with representation from the Inuit, the APP, relevant federal departments and the territorial government would be established to monitor and assess environmental impacts. Procedures would be established to test the feasibility, reliability and safety of expanding the route farther west and north. Research and development on technologies to transport oil through the passage would continue, but no commitment would be made to this activity until the feasibility of year-round shipping had been established. Oil, gas and mineral exploration within the region would not be acceptable under this option.

Implications
The Northwest Passage shipping option is one way to realize national interests while at the same time meeting regional needs. The national energy interests could be substantially served by developing a route to ship hydrocarbon resources from the Beaufort Sea

and the high Arctic to the east coast, even though exploitation of the potential petroleum resources of Lancaster Sound would be foregone. Some of the concerns about the environment would be alleviated, as would most of those about social impacts on the Inuit from non-renewable resource development in the region. However, all the problems associated with year-round shipping would remain, with the eventual approval of oil shipments presenting the possibility of serious environmental pollution.

Resource Use Option 5: Balanced Development

Basic Premise
A reasonable balance can be maintained between the development of renewable and non-renewable resources in the Lancaster Sound region.

Rationale
The Inuit have a strong preference for continuing to base their lifestyle on a renewable resource economy. Hunting, trapping and fishing provide a way of life, a country-food diet and an income - while at the same time preserving the social fabric and sense of community. Tourism and native craft production provide additional income and opportunities. The renewable resource economy depends upon a healthy environment, and the Inuit see non-renewable resource development as a threat to their environment and the biological resources on which their preferred lifestyle depends.

On the other hand, development of the abundant non-renewable resources of the North is important if Canada is to meet its national energy objectives. While this does not mean that all non-renewable resources are to be exploited with disregard for impact on the Inuit society and the environment, it does mean that non-renewable resource development in the North must proceed. With careful planning, and with due regard for social and environmental impacts, non-renewable resources can be developed hand in hand with sustained use of the region's renewable resources.

Description of Activities
The balanced development option, probably more than any other, would require a rigorous planning process. The goals and objectives of the different segments of society involved would have to be carefully evaluated for conflict situations. This would require the evolution of a comprehensive regional plan that would protect the important interests of all sectors, possibly through a zoning system or through procedures for mediation on issues as they arise. New development proposals would have to conform to the regional plan and would thus be subject to careful review for compatibility with existing resource uses.

Whether particular activities would be acceptable would depend upon compromises reached during the planning process and upon the specifications of the comprehensive regional plan. Therefore, no new activities could be introduced into the region until the plan was prepared. It may be that certain activities would not be permitted in the region at all, while others would only be permitted in certain zones.

Implications
Past experience indicates that the non-renewable resource sector could impact heavily on the renewable sector despite the best intentions of all officials. In implementing option 5, the primary concern would be to avoid detrimental effects on the biological resources of the region.

Resource Use Option 6: Non-renewable Resource Economy

Basic Premise
The non-renewable resources of the Lancaster Sound region should be developed.

Rationale
Seismic surveys indicate that Lancaster Sound contains a number of geological structures that may contain sizeable oil and gas deposits. None of these structures has been drilled and so it is impossible to assess the potential size of the petroleum fields.

Canada is attempting to become self-sufficient in the use of petroleum resources through the National Energy Program; the potential resources of Lancaster Sound could be important in reaching that goal. The

government's "need-to-know" policy (see Chapter IV for a description of this policy and the National Energy Program) lends support to an exploratory drilling program through which the resources can be assessed in comparison to potential commercial fields in other regions. Oil companies have invested a large amount of money in seismic surveys, environmental studies and technological research and have indicated a desire to commence exploratory drilling in the near future. Discovery of commercial deposits of oil would lead to production for the import-dependent east coast market with year-round delivery by ice-breaking tankers.

Mining is an important industry in Canada and the attention of this industry has been shifting to the Arctic in recent years. Within the Lancaster Sound region, the Nanisivik lead-zinc mine entered production in 1976, and the Arvik (Polaris) lead-zinc mine is due to begin production in 1982. The Mary River iron ore deposits contain large reserves, but await more favourable economic conditions before development can begin. In general, the Lancaster Sound region has not been explored intensively for minerals and the mining industry is confident that there are more commercial deposits awaiting discovery.

The Northwest Passage, including Lancaster Sound at its eastern gateway, should also be developed as a year-round shipping route for ice-breaking tankers. This would contribute to the National Energy Program by making oil and liquefied natural gas from the Beaufort Sea, Lancaster Sound, and other parts of the high Arctic available to east coast markets.

Description of Activities

Exploration for petroleum and mineral resources in the region would be encouraged. Although each project would have to obtain approvals within the existing regulatory framework, and every effort would be made to minimize environmental and social impacts, the emphasis of government and the planning authorities would be placed on proceeding rapidly with resource exploration and development.

Exploratory drilling for oil and gas and, if successful, subsequent development of the discovered hydrocarbon reserves would bring considerable activity to the area. This would include the operation of drill and support ships and aircraft, the setting up of onshore bases, support services and the transportation and housing of work crews. (For a more detailed description, refer to Appendix B.)

Exploration for base metals is non-intensive until a deposit of potential economic significance is discovered; at that point, activities increase significantly. These include construction of storage and operating facilities, a townsite, and associated facilities such as shipping docks, roads, airstrips, and areas for tailings disposal. Production is year-round with the product being stockpiled for shipment during the open-water season.

Three types of shipments would take place: seasonal shipping of minerals or concentrates during the open-water period; year-round loading and shipment of petroleum resources from the Lancaster Sound region; and year-round transshipment of petroleum resources (both oil and liquefied natural gas) from Beaufort Sea and high arctic fields to the east coast. The support and supervision of the Northwest Passage shipping route would require the installation and maintenance of navigational aids; increased ice-breaker support; search and rescue facilities; a vessel traffic management system; pilotage; and external service activities such as hydrographic, oceanographic, meteorological, ice information, and dredging facilities.

All proposed activities would be permitted, providing that the projects obtain approval pursuant to the existing regulatory processes. However, parks and conservation areas would not be established until the petroleum and mineral resources had been assessed.

Implications

There are strong economic arguments to be made in support of this option. The national economy would benefit, not only by the development of the resources of Lancaster Sound, but also by the use of the Northwest Passage as a major shipping route.

The question of regional economic gains can be argued both ways. Although, as measured by standard economic indicators, the regional economy would be stimulated, it is not certain that the existing Inuit population would benefit from a non-renewable resource economy. Both the petroleum and mining industries stress the large number of jobs that would be available to the Inuit. However, the Inuit point out that: (1) there already is an adequate number of jobs for unskilled workers in the Arctic; (2) not many Inuit are trained for technological positions; and (3) few Inuit have a desire to abandon their preferred lifestyle to take permanent jobs on oil rigs or in mining camps.

The social and environmental impacts of pursuing this option could be catastrophic. The wealth of the biological resources of the Lancaster Sound region could be severely depleted despite the best efforts of regulatory authorities. The existing Inuit way of life could be rapidly eliminated. There is little doubt that this option would be the classic example of the local area paying the price for national economic gains.

IV. The Framework of Policies and Initiatives

The various views on the future use of the resources of the Lancaster Sound region articulated during the study's public review phase have been outlined in Chapter II. This spectrum of views and perspectives was then converted into a series of options ranging from no new development to the concerted exploitation and transportation of non-renewable resources.

As one examines each of these options to determine to what extent it would furnish a suitable basis for the future use and management of the region, various matters have to be considered. The most immediate of these are the legal status of the land and waters that constitute the Lancaster Sound region, and the national policies, priorities and objectives that have a bearing on planning and decision-making for the region. The evaluation of options for the use and management of the region's resources, and the subsequent formulation of any long-term regional strategy, will clearly be affected by policies and programs of broad northern or national scope. For this reason, the following section provides a brief description of national policies and initiatives that have a bearing on planning for resource development in the North generally and the Lancaster Sound region specifically.

Sovereignty

An understanding of the legal status of the waters and lands that constitute the Lancaster Sound region is essential to any consideration about its future use and management. This legal status determines the degree of control that Canada can exercise in the region; it, therefore, has a direct bearing on the options available. The link between the Lancaster Sound Regional Study and the issue of sovereignty was underlined by many during the public review phase. Questions such as "To what extent can Canada control shipping, drilling and mining activities in the Lancaster Sound region?" need to be answered.

With respect to land, Canada's sovereignty over its arctic regions, including the islands of the Arctic Archipelago, is well established under international law and unchallenged by the community of states. Sovereignty over the Northwest Territories and the islands of the archipelago was officially transferred from Great Britain to Canada on September 1, 1880. Since then, Canada has exercised sovereignty over these areas as an integral part of the country, and Canadian laws and regulations apply to them as to any other part of Canadian territory. It follows that human activities on the islands of the Lancaster Sound region are subject to Canadian laws and regulations.

Although the legal status of the Arctic Islands is clear, the legal status of the waters surrounding the islands has been frequently misinterpreted over the years. The confusion stems perhaps from the common use of the expression "Canadian waters," which according to relevent legislation such as the Territorial Sea and Fishing Zones Act and the Canadian Shipping Act, includes both territorial seas and internal waters, whereas these two concepts are governed by distinct legal regimes under international law. The waters within the Arctic Archipelago, including those of the Northwest Passage, are internal waters of Canada. Canadian sovereignty has been manifested over a lengthy period of time by control over these waters and by a series of administrative and legislative acts. Moreover, the Northwest Passage has never attained the status of an international strait by customary usage, nor has it ever been defined as such by conventional international law. This is not surprising since the numerous sea channels running through the Canadian Arctic Archipelago are ice covered for most of the year. From a legal viewpoint, all marine traffic in this area, including Lancaster Sound, is therefore subject to national statutory and regulatory requirements, and it is open to Canadian authorities to refuse entry to or apply preconditions for the navigation of foreign vessels through the Northwest Passage. This is not to say that Canada would, as a matter of policy, deny passage to foreign vessels; in fact, some assurances have been given, in the past, on this matter to other governments.

Beyond internal waters, Canada has a 12-mile territorial sea in the Arctic as elsewhere along its coast. The 12-mile territorial sea is now widely recognized as customary under international law and is included in the draft convention under consideration by the Third United Nations Conference on the Law of the Sea. The territorial sea is subject to sovereignty of the

coastal state with the exception of a "right of innocent passage" for foreign vessels.

With respect to possible drilling activity in Lancaster Sound and Baffin Bay, it should be noted that, under international law, Canada exercises sovereign rights over the continental shelf and the resources contained therein and has jurisdiction over installations and devices necessary for the exploration and exploitation of these resources. These rights flow from Canada's sovereignty over the adjacent mainland and islands and are subject to no dispute, no competing claim and no challenge. Sovereign rights of the coastal state over its continental shelf are a principle of customary international law; they have also been codified in the 1958 Geneva Convention on the Continental Shelf, to which Canada is a party, and reiterated in the draft Convention on the Law of the Sea Conference.

In 1970, the Canadian Parliament enacted the Arctic Waters Pollution Prevention Act, which provides for pollution control jurisdiction within a zone of 100 miles from the Arctic Islands. This once controversial legislation has now won international approval. The draft Convention on the Law of the Sea incorporates an article recognizing the right of coastal states to adopt and enforce measures required for the protection of the environment in ice-covered waters within a 200-mile limit. Canada also exercises fisheries jurisdiction as far as 200 miles from the coast under the Territorial Sea and Fishing Zones Act. This limit is widely recognized in state practice, is part of the draft Convention on the Law of the Sea, and can be considered as part of customary international law.

Major National Policies Affecting Northern Development

National Objectives for the North (1972)
In response to the magnitude and speed of northern development initiatives in the early 1970s, the federal government prepared a policy statement on northern development,[1] most of which still remains valid as Canada enters the 1980s. In the words of the preamble:

"People, resources and environment are the main elements in any strategy for northern development . . . the needs of the people in the North are more important than resource development and . . . the maintenance of ecological balance is essential. In the setting of objectives and priorities in the North, in line with national policy goals, the essence of choice for the Government is to maintain an appropriate degree of balance among these three elements."

[1] *Canada's North 1970-1980.* Statement of the Government of Canada on Northern Development in the 1970's. Presented to the Standing Committee on Indian Affairs and Northern Development by the Honourable Jean Chrétien, Minister of Indian Affairs and Northern Development, March 28, 1972.

The national objectives, outlined in the policy statement, are comprehensive in scope and reflect a priority on social and environmental considerations. In the 1970s the emphasis was placed on "people programs" aimed at assisting northern residents to adjust to the pace of economic change and to prepare themselves for participating meaningfully in northern development. In response to this clear policy statement, new pieces of legislation and regulatory systems were designed to protect the northern environment; social programs were introduced; and new national park reserves were established.

An Energy Strategy for Canada (1976)
When the availability of petroleum resources became a concern following the events of 1973 in the Middle East, the government re-evaluated its energy policies and embarked on a program aimed at energy self-reliance. The resulting energy policy statement of 1976,[2] commonly referred to as the "need-to-know" policy, called for accelerated exploration to delimit the nation's oil and natural gas resources. In consequence, hydrocarbon exploration activities were stimulated in the North's onshore and offshore areas; at the same time mineral exploration and development were accelerated.

[2] *An Energy Strategy for Canada: Policies for Self-reliance.* Supply and Services Canada, Ottawa; 1976.

The National Energy Program (1980)
The present world oil situation threatens the economic growth and stability of the world and profoundly affects the nation. Canada's strategy, in response to this situation, is outlined in the National Energy Program[3] and supported by the Canada Oil and Gas Act. This new program is needed from the standpoint of industry (to establish certainty of tenure of oil and gas rights) and of government (to provide for an effective regime to fulfill the envisaged objectives). The National Energy Program sets three major objectives: security of supply, fairness in pricing and sharing of revenues, and opportunity for Canadians to participate in energy industries.

Statement by the Minister of Indian Affairs and Northern Development, March 24, 1981
In a statement to the Standing Committee on Indian Affairs and Northern Development, the Honourable John C. Munro gave further elaboration on the government's positions regarding native rights and the North. The "ultimate objective for all people 'north of 60' is . . . greater political, social and economic self-sufficiency and full participation in Canada's future development." Settlement of outstanding land claims is one of the prerequisites for the attainment of these goals. With respect to national energy requirements, the minister stated that resource development must proceed in a way compatible with Canada's national interest as well as the interest of northerners. Adequate safeguards must be provided to protect the environment and cultural heritage of native northerners in conjunction with non-renewable resource development activities.

To recapitulate, the increasing activity in the North during the 1970s arising from non-renewable resource development programs resulted in concerns about the ability of the government's programs to maintain a balanced approach to northern development — the goal put forth in the "Statement on Northern Development in the 1970s." However, the 1980 National Energy Program and the minister's statement before the standing committee have affirmed that non-renewable resource development in the North must be environmentally sound and result in real net benefits to northerners. The National Energy Program states specifically that "the need for frontier resources, given other options that Canadians can proceed with, is not so great that it must override our social goals and obligations."

The basic elements of the government's northern development policy thus have remained constant over the last decade: In essence the government strives for an appropriate degree of balance between the people, the resources, and the environment in any strategy for resource development. The prime considerations in planning for northern development are the needs and aspirations of northerners and the maintenance of the North's environmental quality. Secondly, the development of renewable and non-renewable resources will proceed as technology and economics permit but must remain in keeping with the above considerations. Thirdly, the people of the North should have the capacity to participate effectively in decision-making concerning the North.

Policies of More Specific Application
Various policies of more specific application have a bearing on regional planning in the North, including policies on northern roads, airports, provision of arctic marine services and the establishment of national parks.

Present government policy is to build roads to facilitate the development of resources and to improve airports to certain standards relative to population density, and to do so in a manner that is in keeping with sound environmental practices. The Department of Transport recently developed the Arctic Marine Services Policy for the provision of an adequate level of services in support of marine transportation and related activities in the Canadian Arctic. The policy applies to the entire Arctic and is intended to cover seasonal resupply, grain and mineral shipments, and

[3]Department of Energy, Mines and Resources. 1980. *The National Energy Program.* Supply and Services Canada, Ottawa.

year-round hydrocarbon traffic. It provides for a policy and administrative framework for all elements of marine transportation. Parks Canada's policy is to protect for all time those places that are nationally significant examples of natural and cultural heritage and to encourage Canadians to understand, appreciate and enjoy their heritage in ways that leave it unimpaired for future generations.

In addition to the above, the Federal Policy on Land Use (Department of the Environment) is designed to guide the internal activities of the federal government with respect to their effects on the use of private and public lands throughout the nation. It consists of a series of internal policy statements and land use guidelines that will be applied to all federal government activities to ensure that consideration is given to their impact on land resources.

Current Policy Initiatives

Of direct significance to future decision-making with respect to resource use and management in the Lancaster Sound region are various specific policy thrusts and programs currently being developed by federal departments and the territorial government. The policy initiative of most direct application is the new policy on comprehensive northern land use planning which was announced by the Minister of Indian Affairs and Northern Development on July 30, 1981. The policy is designed to improve management of land and resources and to resolve conflicting resource use interests in the northern territories. Implementation of this new policy is of material importance to further discussion on the future use and management of the Lancaster Sound region. It is therefore discussed in more detail in Chapter V.

Other relevant Indian and Northern Affairs initiatives are the preparation of an environmental management framework for the North, being developed in collaboration with the departments of the Environment and Fisheries and Oceans, and a new policy for the exploitation of gravel and other surficial materials on submerged lands beyond the 12-mile territorial limit. The government is also developing a northern hydrocarbon strategy that responds to the urgent need for effective planning, management and regulation of major hydrocarbon development proposals. The strategy recognizes the advantages of demonstration projects that enable the preliminary testing of environmental impacts and the development of innovative technology to deal with severe northern physical constraints. Full consideration will also be taken of the interests and concerns of northerners with respect to viable compromises for the development of northern hydrocarbon potentials.

An administrative group, the Canadian Oil and Gas Lands Administration (COGLA), has recently been established by the departments of Energy, Mines and Resources and Indian Affairs and Northern Development. It will be reponsible for the regulation of oil and gas interests in "Canada lands"[4] as provided for under the Canada Oil and Gas Act, the Oil and Gas Production and Conservation Act, and other related statutes in the respective areas of jurisdiction of the two ministers. The main purpose for establishing this group is to streamline the evaluation, assessment, approval (or denial), and regulation of oil and gas projects in Canada lands.

Under the Canada Oil and Gas Act two revolving funds of $15 million each will be set up to cover the costs of environmental baseline research by assessing oil and gas acreage holders. The Department of Indian Affairs and Northern Development will direct the conduct of the research studies north of 60°, while the Department of Energy, Mines and Resources will be responsible for all other frontier lands. These studies will be significant in assessing environmental impacts of proposed non-renewable resource development projects.

The Department of the Environment implements national policies for national and historic parks, environmental research and data services, and environmental

[4] "Canada lands" are the lands making up Canada's frontiers; they cover a total area almost twice as large as that of the ten provinces combined - specifically those lands encompassing some 2.5 million square miles (6.5 million km²) of submarine area in the offshore region and 1.5 million square miles (3.9 million km²) in the Yukon and the Northwest Territories.

protection; a policy to guide its activities in the North is currently being reviewed by the department. The Department of Fisheries and Oceans is preparing a policy statement on fisheries and marine mammal resource management in the North.

Another current government initiative is the evolution by the Federal Environmental Assessment and Review Office (FEARO) of a policy concerning more effective processes for the review and assessment of development projects, including the funding of intervenors to participate in the process. This is being done in collaboration with the departments of the Environment and Indian Affairs and Northern Development and both territorial governments.

Comprehensive Land Claim Negotiations

The Inuit of the central Arctic, Keewatin and Baffin regions of the Northwest Territories are currently negotiating a comprehensive settlement of their aboriginal land claim with the government of Canada. The negotiations are being directed by the Nunavut Claims Executive Committee under the aegis of the Inuit Tapirisat of Canada. ITC is a national organization representing the Inuit of the Northwest Territories, northern Quebec and Labrador. Parallel to the land claim negotiations, ITC is also engaged in an effort to achieve a political restructuring of the Northwest Territories that would result in the establishment of a "Nunavut territory" with its own government, in the central and eastern Arctic.

The Nunavut Claim and Political Development

Discussion between the Inuit and the federal government on the claim, entitled "Nunavut," began in the mid 1970s. From the beginning of these discussions to the present stage of negotiations, ITC has recognized that the responsibility for negotiation and implementation was with the Inuit of Nunavut. The claim is now being actively negotiated by Inuit representatives from the Baffin Region Inuit Association, the Keewatin Inuit Association and the Kitikmeot Inuit Association.

ITC's commitment to the concept of self-government within a new territory was reaffirmed in 1979 with the adoption by the annual general meeting of a document entitled *Political Development in Nunavut.* In mid-1980, ITC indicated that it was ready to resume formal negotiations on land ownership and related aspects of its claim. This was done on the understanding that the proposal for the creation of Nunavut would be dealt with outside the claims forum in the context of a government review of the larger issue of constitutional change in the Northwest Territories. Negotiations began in earnest in November 1980 and have continued through 1981 with negotiations concentrating on the wildlife component of the overall agreement-in-principle.

ITC still maintains that any final settlement of its land claim is conditional on the achievement of its political goal, the creation of a Nunavut territory. A plebiscite will be held in the Northwest Territories in early 1982 to vote on this issue.

Nature of the Claim

The Nunavut claim was accepted for negotiation under the 1973 federal policy statement on comprehensive land claims, in which the government affirmed its commitment to negotiate comprehensive settlements with native peoples in those parts of Canada where aboriginal interest in land had not been extinguished by treaty or superseded by law. Such claims are referred to as "comprehensive" because of the broad nature of the demands, which include land, financial compensation, access to resources, and other benefits. Each claim is judged by the federal government on its own merits. Consequently, the terms of settlement for each individual claim could differ significantly.

In the case of the Nunavut claim, the topics proposed by ITC for negotiation include:

- interim protective measures;
- land ownership;
- land management and planning (Inuit participation);
- wildlife harvesting rights and Inuit participation in wildlife management;
- economic and social development provisions;
- monetary compensation; and
- local government.

Of particular significance for the Lancaster Sound Regional Study are the following Inuit concerns:

1. Interim protection measures that the Inuit have proposed during the course of negotiations. These include:
- community approval for issuance of land use permits within a 60-mile radius of communities and within IBP and other critical habitat sites;
- a call for a three-year moratorium on drilling in Lancaster Sound; and
- a comprehensive independent inquiry into oil tanker traffic through the Northwest Passage.

2. Inuit land ownership.

3. The powers of the Nunavut-wide land use planning and management regime as it relates to both onshore and offshore areas. As coastal people, Inuit are seeking to confirm certain rights in the offshore areas, particularly access to landfast ice for harvesting purposes, and to establish a system of marine management and environmental protection for coastal areas.

4. Economic development measures and participation (including training and employment).

5. Inuit claims to royalties or subsurface rights in onshore and offshore areas.

6. Involvement by Inuit in wildlife harvesting and management of the region's renewable resources.

7. Provision for compensation for loss of harvesting potential in the event of damages caused to the environment by non-renewable resource development.

The role of the proposed Nunavut territorial government in the management of the Lancaster Sound region is also of particular significance for the Lancaster Sound Regional Study.

Agreement has recently been reached on the wildlife provisions of an overall agreement-in-principle. The wildlife agreement provides for a joint Inuit-government management board to exercise strong advisory and managerial functions with respect to wildlife in the central and eastern Arctic. The agreement outlines specific wildlife harvesting rights that the Inuit will enjoy in their claim area and includes provision for the continuation of hunting, fishing and trapping by non-Inuit. The agreement will now be reviewed by the executive level of each side before the resumption of negotiations to reach a final agreement as part of a comprehensive settlement.

ITC proposes that claim negotiations deal next with communications and social development provisions. Documents on land and marine management will be tabled in 1982.

At the negotiating table, Inuit have voiced concerns for industrial development and tanker traffic in the Lancaster Sound area. Although they were assured that they would have the opportunity to protect their interests through various hearings and processes, including the Lancaster Sound Regional Study, the Inuit have stressed their wish to settle land claims before any major new developments are approved.

V. Regional Planning

The Lancaster Sound Regional Study was established to stimulate informed discussion on resource use issues and to provide the foundation and framework for a regional planning process. An appropriate planning body for the Lancaster Sound region will be formed sometime after completion of the green paper in order to implement that process.

Regional planning is a process for guiding development of a region according to established principles and objectives. A successful regional planning process requires the meaningful involvement of the people of that region. This does not imply that they have complete control over the process. Throughout Canada, regional planning bodies must balance external interests with internal ones and must operate within defined legislative and regulatory frameworks. Presumably any regional planning body established for Lancaster Sound would have similar restrictions placed upon its degree of planning control.

However, if a regional planning process is to be successful, it must be seen as a legitimate one through which all sides of an issue can be addressed and dealt with in a reasonable way. It is not likely to be viewed this way if decisions are dominated by a particular sphere of interest, particularly when the locus of that sphere is outside the region. At present the people of the Lancaster Sound region do not have a planning process to participate in at all, much less a legitimate one.

A crucial element in planning for the Lancaster Sound region is the matter of the current Inuit land claim negotiations as outlined in the previous chapter. The terms of the eventual land claim settlement, and the form of political devolution that accompanies it, will have a lot to say about how resource use and management will be carried out in the future. Because of this, the Inuit and various other participants in the public review process have taken the position that land claims must be settled before any further development takes place in the Lancaster Sound region.

To be effective, a continuing regional planning body for Lancaster Sound must have terms of reference and a membership that are acceptable to government, to the communities in the region, and to those organizations sharing an interest in both the development and the conservation of the region's resources. Furthermore, although the planning process may begin before a comprehensive land claims settlement is concluded, the process must be capable of functioning during this interim period and of continuing following the settlement.

Workshop Proposals for Planning

The need for a regional planning process was a central topic of discussion at the Resolute and Ottawa workshops of the Lancaster Sound Regional Study. Many of the submissions at the workshops specifically referred to this need and some of them advanced proposals for particular planning structures. At the Ottawa workshop, it was discussed at length and the conclusion reached that some form of regional planning body with meaningful involvement of the local people was required. In the words of the workshop chairman, "Consensus on the need for a planning framework as a means of managing future uses in the region was one of the clearest and most convincing reactions to the green paper derived from the public process."[1]

Although there was a consensus in the workshops on the need for a regional planning process, there was no unanimity on the form that it should take nor on the degree of influence that the people of the region should have over decision-making. A summary of opinions expressed by public interest groups, by industry, and by government departments follows.

The Canadian Arctic Resources Committee's paper, *Lancaster Sound 1980-2000,* stimulated a good deal of the discussion on the planning process. CARC stressed the need to develop a consensus on principles that should guide the future of Lancaster Sound (see "Planning Considerations" in this chapter), and suggested that an interim planning committee, repre-

[1]P. Jacobs. 1981. *People, Resources and the Environment: Perspectives on the Use and Management of the Lancaster Sound Region.* Chapter 4: Management of the Region: A Consensus. Department of Indian Affairs and Northern Development.

sentative of non-government interests in the region, be established and funded by the government of Canada. Inuit spokesmen expressed a preference for a management board, rather than an advisory committee, which would be interim until land claims were settled and would contain equal representation of northern and southern people. The University of Waterloo submission asserted that the Inuit must have time to establish their own planning institutions and to take more control over the process itself.

Support for regional planning was also expressed by representatives of industry. Norlands Petroleums Ltd. stated that northerners should be involved in planning and should participate in, and benefit from, resource activities. Petro-Canada strongly supported the need for regional planning and stressed the need for local people to be involved to the degree that reflects their interests in the region. However, most industry spokespeople appeared to regard planning as a means to speed approvals for development projects and to focus on the opportunities for ameliorating impacts and providing benefits to northerners and to industry. In their view, the people of the region should be consulted with and should provide planning advice, but decision-making should remain outside the region in order to serve the national interest.

The Department of the Environment recommended that significant industrial activity or major development should not proceed in the Lancaster Sound area without a systematic planning process through which the goals and strategies for the region could be set out and that this process should have a community base. The Department of Fisheries and Oceans emphasized that the regional study must lead to the establishment of a management framework involving the participation of the various interests in Lancaster Sound and that this framework must include a continuing planning process. The government of the Northwest Territories agreed that there was a need for an ongoing and systematic planning process for the Lancaster Sound region and recommended the establishment of a regional board under federal legislation to work out and implement a plan for the orderly development of the natural resources of the area. The board would be "tripartite" in nature, having equal representation from the federal, territorial and local governments.

In his report on the public review phase of the Lancaster Sound Regional Study, Chairman Peter Jacobs summarized the planning problem: To what extent can a viable planning process for north of 60° be designed that will accommodate the potentially conflicting goals - development for the national interest and maintenance of lifestyle options for the Inuit? He recommended that a two-year period be set aside to establish an operational planning process and that Indian and Northern Affairs' new northern land use planning policy be tested forthwith in the Lancaster Sound region.

Northern Land Use Planning

On July 30, 1981, the Honourable John C. Munro, Minister of Indian Affairs and Northern Development, announced approval by the federal government of a policy on northern land[2] use planning, designed to improve the management of land and resources and to resolve conflicts between resource users, including native people, resource developers, and conservationists. Under this policy, a system for land use planning is to be established in the Yukon and the Northwest Territories in order to:

- avoid or minimize land use conflicts arising from the inability of different land uses to be accommodated on any area of northern lands;
- ensure the integration of the management of northern land resources;
- enable northern lands to be allocated and used in an optimum way, taking into account local, regional and national interests and concerns and the physical and biological characteristics of northern lands and the resources they support; and
- allow for public participation in the decision-making process concerning allocation and best use of northern lands.

An organizational structure will be established to facilitate co-operation and participation among government

[2]The term *land* in this context includes both onshore and offshore components of an area.

agencies (both federal and territorial) at the policy and operational level, to carry out planning in the territories and to ensure public involvement in the planning process. The details of the organizational structure have not yet been finalized, but they are expected to include the following:

- A northern land use policy committee with membership drawn from departments and agencies having northern land- and resource-related interests, including the territorial government. The committee will provide direction at the policy level, develop program objectives, set priorities for planning and provide direction for the initiation and conduct of northern land use planning.

- To direct the operation of planning in the northern territories, land use planning commissions will be established whose co-ordinating committees will have representation from native organizations and federal and territorial government departments and agencies. The land use planning commissions will be supported by planning secretariats that will carry out the actual task of planning.

- For each planning region, a planning area review panel will be formed to provide a structured forum for public input and involvement. The exact terms of reference and composition of the panels can vary depending on the characteristics of the planning region. However, local authorities, native groups, and others having a direct interest in the planning area will be directly involved.

Working Towards Northern Land Use Planning in the Lancaster Sound Region

The government-approved policy on northern land use planning, as described in the previous section, lays out the framework of the new program. However, because the details of regional implementation are in the developmental stage, it does not provide much guidance on how the program should be implemented at this level. Regional implementation will likely remain somewhat flexible so that, within the approved policy framework, it can be adapted to fit the planning needs of the region and its inhabitants.

In considering possible ways to carry out northern land use planning in the Lancaster Sound region, two overriding considerations should be kept in mind: (1) although the new policy has been approved and will be implemented, it remains uncertain how comprehensive it will be and how soon it will become functional in the Lancaster Sound region; and (2) whatever planning process is initiated, it is likely to require review and adjustment when land claims are settled, particularly if a Nunavut territory is established. With the above considerations in mind, two options for working towards implementing the northern land use planning policy in the Lancaster Sound region are advanced for discussion.

Planning Process Option 1: An Interim Planning Advisory Committee

Basic Premise

The Department of Indian Affairs and Northern Development should establish an interim planning advisory committee to provide advice on all Lancaster Sound regional planning issues until a permanent system comes into effect.

Rationale

There was a consensus among the participants in the Lancaster Sound public review process that some form of regional planning body, with representation from the Inuit residents, should be established. An interim planning advisory committee could be set up and used as the planning vehicle at least until the system under the northern land use planning program comes into operation.

How It Would Work

The interim planning advisory committee would be established by the Minister of Indian Affairs and Northern Development (no legislation would be required). The terms of reference and the composition of the committee would be determined following consultations with the Baffin Regional Council, the government of the Northwest Territories, other federal departments, the Baffin Region Inuit Association, and the Inuit Tapirisat of Canada. A substantial portion of the members would be residents of the Lancaster

Sound region. An "impartial" chairperson, acceptable to all sectors, would be appointed by the minister. The committee would be provided with a level of funding sufficient to hire planning staff and conduct its business. The minister would also appoint a technical advisory group to assist the interim planning advisory committee on technical and scientific matters.

The terms of reference would give the interim planning advisory committee a substantive role to play in regional planning despite its nominally advisory nature. This would be done by building a comprehensive and open planning process around the committee. The minister would require that all project proponents (including federal departments and the government of the Northwest Territories) consult with the interim planning advisory committee at an early stage and that the committee be informed on all prospective planning issues. The committee's mandate might, for example, enable it to intervene in regulatory hearings on projects; to hold its own public meetings and workshops on planning issues; to work towards a regional plan; and to make recommendations to the minister regarding the implementation of northern land use planning and of regional planning generally. In any of the activities the committee would act in an advisory capacity to the minister, who, in turn, would maintain the credibility of the process by demonstrating that the committee's advice carried considerable weight in government decision-making.

Relationship to the Northern Land Use Planning Policy
It will take sometime before a comprehensive planning system under the northern land use planning policy will actually be in operation in the Northwest Territories. Until that time, the interim planning advisory committee would maintain the momentum generated by the Lancaster Sound Regional Study. Its practical experience and advice could also make a valuable contribution to the design of the northern land use planning structure and process at the regional level.

Implications
An interim planning advisory committee could be a useful vehicle for acclimatizing the participants to a regional planning process and the accommodations that must be made in reaching a consensus on planning issues. In addition, it could provide a prototype for more comprehensive regional planning that would be helpful both to the federal government and to the government of the Northwest Territories. The terms of reference and the composition of the committee could readily be adjusted over time to improve its efficiency and effectiveness.

However, government could have difficulty in establishing and maintaining the credibility of the process. The Inuit might not agree to participate in any advisory process in the first place, or they might withdraw at any time. The committee would not have decision-making powers; as a result members might lack the inclination to reach consensus on planning issues, thereby forcing government to handle them. The government, in view of its national energy priorities, might not be happy with the time required for the planning process to work or with the advice received from the committee.

Planning Process Option 2: A Planning Board

Basic Premise
Government should enact legislation to establish a planning board with authority to carry out planning for the Lancaster Sound region.

Rationale
A duly constituted planning board for the Lancaster Sound Region would have legislative authority to carry out regional planning and to implement planning decisions, thereby avoiding the potential inadequacies of an advisory committee process.

How It Would Work
The legislation establishing the planning board would specify its mandate. The board would be authorized to prepare a regional plan, submit it to the government for approval, and oversee its implementation. All resource activities taking place within the region would require licensing or approval in accordance with the plan, or else be required to use planning mechanisms to apply for easements or exemptions. The planning board would not have complete authority over all plan

ning issues, however, and its relationship with the northern land use planning program and with regulatory agencies (such as the Northwest Territories Water Board, the National Energy Board, or a possible Northwest Passage shipping authority) would have to be stipulated in the enabling legislation. In these situations the planning board would still play a key role in a consultative and advisory capacity by trying to ensure that all resource use activities would be compatible with the regional plan.

Appointments to the planning board would be made by government in accordance with procedures laid down in the legislation, with due consideration of representation for regional, as well as national, interests. The planning board would be funded to hire its own executive director and staff and to conduct its business from an office located in the Lancaster Sound region.

Relationship to the Northern Land Use Planning Policy
The planning board called for by this option would be established pursuant to new federal legislation. Its mandate would include determination of a regional plan for Lancaster Sound as well as authority over management decisions required to implement the plan. This option, therefore, calls for a broader authority than is contemplated for the northern land use planning system, and its relationship to that system would require careful consideration.

Implications
The planning board would establish a continuing, systematic planning process for the region. Its mandate could give it the scope to pursue genuinely comprehensive physical, economic and social planning. If properly implemented, the planning process should stand a good chance of maintaining its credibility in the eyes of all interested parties. The balance of representation on the board has obvious implications for the control of decisions, and equally obvious implications for what will be acceptable to the Inuit and to national energy interests. There would, however, be some real difficulties in reconciling this option with the system now envisaged under the northern land use planning program.

There is also the distinct possibility that the planning board may be viewed as too powerful and inconsistent with existing local government institutions, such as the Baffin Regional Council. Moreover, establishing a planning board for one region of the North and not the others may lead to inconsistencies and dissatisfaction. The Inuit may not want to see a powerful planning board established and operating before native land claims are settled. The planning board option may be an appropriate long-term objective, but may not be suitable at this time.

Planning Considerations

Planning Region
As part of the ongoing planning process for Lancaster Sound the boundaries for the planning region may need to be redefined to enable a more realistic examination of the proposed uses and their possible impacts on the region. At the beginning of the Lancaster Sound Regional Study, the proposed industrial activities for the Sound were thought to be sufficiently localized so that they could be adequately examined within the present study boundaries. However, in the course of the study, it became apparent that the environmental and economic implications of many of these activities would extend beyond the confines of the region, as now defined. For example, the Northwest Passage may develop into a major transportation artery, with year-round ship traffic through Lancaster Sound and Baffin Bay. In that event, the environmental and socio-economic influences of this activity on the entire transportation route need to be examined. Delineating the planning region so that it more accurately reflects the ecological interactions with the adjoining marine areas of Jones Sound and Baffin Bay might also facilitate the assessment of environmental impacts. The traditional uses of the land by Inuit have a wider sphere of influence than is acknowledged by the present study area. It is for this reason that the Inuit frequently requested that those living in Pangnirtung or Broughton Island, or even the settlements in western Greenland, be involved in the public review.

Definition of Planning Objectives

A necessary step in arriving at a comprehensive management plan for the use of Lancaster Sound will be to set planning objectives that can be used to examine the opportunities and constraints offered by each option. These objectives need to clarify how the interests of the local people can be served within the framework of national policies and regional goals and interests. All interested parties should have an opportunity to participate in defining the planning objectives.

A set of *tentative planning principles* for the region has been formulated and already has received some public review. These seven principles were drawn up in 1979 by the participants of a workshop on Lancaster Sound,[3] sponsored by the Canadian Arctic Resources Committee (CARC). The principles were later accepted by a meeting of representatives of the Lancaster Sound communities of Arctic Bay, Grise Fiord, Pond Inlet, and Resolute, the Baffin Region Inuit Association (BRIA), Inuit Tapirisat of Canada (ITC), and CARC. During the public review of the draft green paper, the seven principles were further discussed at both the Resolute and the Ottawa workshops and were broadly accepted by senior government officials and the proponents of industrial development, as well as by Inuit, conservationists and academics. While a consensus was readily obtained on the intent of the principles, agreement on exact wording could not be achieved in the workshop setting. The wording adopted here incorporates revisions suggested during the study's public review phase.[4]

1. Maintenance of Biological Productivity and Environmental Quality

During and subsequent to any human activity in the Lancaster Sound region, the basic biological productivity and the resilience and viability of the ecosystem shall be maintained. No species or component of the biological system shall be seriously disturbed, endangered, or extirpated by human actions.

2. Interrelationships Between Biological, Technical, and Social Concerns

In considering the need for knowledge and the concerns that are taken into account in making decisions for formulating policies affecting the Lancaster Sound region, attention must be given to three distinct types of problems:

- those related to knowledge of the ecological requirements of living things and the effects on biological systems of artificial (man-caused) or natural perturbations of the environment (mainly biological problems);
- those related to increasing the feasibility, safety, and efficiency of any industrial or technical operations under consideration for the region (mainly technical and physical problems); and
- those related to social, cultural, and community development, and the needs, values, and aspirations of the human inhabitants of the region (socio-economic and cultural problems).

It is important that the interrelationships between these types of problems be given adequate attention.

3. Integrated Environmental Management

Environmental stresses caused by petroleum, mining, and other industrial development in the Lancaster Sound region should not be considered in isolation. The potential and cumulative impacts of all activities and their interactions must be considered in developing management and environmental protection measures for the region.

4. Rights and Responsibilities of Northern Residents

Northern residents and communities have special

[3]E.F. Roots. 1979. *Lancaster Sound: Issues and Responsibilities.* Environmental Science Workshop for the Lancaster Sound Region. Canadian Arctic Resources Committee.

[4]P. Jacobs. 1981. *People, Resources and the Environment: Perspectives on the Use and Management of the Lancaster Sound Region.* Department of Indian Affairs and Northern Development.

rights and responsibilities with respect to the use of Lancaster Sound and the protection and management of its resources. It is important that they be given the information and means to exercise those rights and responsibilities to a degree at least equal to the rights and powers that citizens in other parts of Canada have with respect to areas where they live.

5. Protection of Special Areas

Some specific areas and some species or components of the ecosystem in the Lancaster Sound region deserve and will require special protection to ensure their continued existence and viability. This protection may be needed to prevent damage from the effects of a continuation or expansion of those activities that have been carried on in the past, from cumulative social and non-consumptive developments, from the effects of current and future economic industrial activity.

6. Regional and Long-Term Management

A regional and long-term approach, with due awareness of spatial and temporal variations, must be taken regarding decisions on the use and management of the Lancaster Sound region. The regional problems and strategies should be addressed in the context of northern policies in general, and of national or regional policies.

7. Accident Prevention and Mitigation of Environmental Damage

The techniques and mechanisms used to prevent accidents that will affect the environment, or used to prevent serious damage to the environment in the event of accidents or unplanned incidents, should be an integral part of the evaluation of the benefits, risks, and costs of activities in the Lancaster Sound region. The degree to which such techniques or mechanisms are proven or demonstrated must be taken into account at the time that permission to proceed with any industrial development is being considered.

The suitability of these tentative principles to serve as the base for regional planning objectives for Lancaster Sound will have to be carefully examined.

Conservation

At present various mechanisms exist that seek protection of environmentally significant areas in, and adjacent to, the Sound. These approaches are all valid in their own right; however, they involve different departments and levels of government with different interests in the region and employing different criteria for selection. All sectors of the public seem to agree that steps should be taken to preserve unique areas in the region. Confusion exists, however, about the various selection criteria and procedures; thus, there is concern about the apparently unsystematic manner in which conservation areas are identified and selected.

Lack of co-ordination with regard to identifying, evaluating and delineating conservation areas will hinder regional planning for Lancaster Sound.

A strong requirement exists, therefore, to implement a comprehensive system for the identification of all ecologically significant areas or habitats north of 60°. A coherent process, operated in conjunction with the northern land-use planning system, through which the appropriate level of protection can be applied to each of the selected areas would also then be needed.

Expansion of Knowledge Base

Effective ongoing planning for the North will need to be accompanied by a concerted effort to acquire a better understanding of ecosystem dynamics, of environmental interactions with man-induced changes, of the socio-economic ramifications on the region of industrial development activities, and so forth. Close co-ordination of these studies will be essential because of the diverse institutions, agencies, and departments involved in these fields of research. With respect to Lancaster Sound, the existing information base appears to be still inadequate to enable reliable assessments of the impacts by the proposed activities on the region's biological resources or physical environment. Also, reliable information is not available at this time to determine to what extent biological resource harvesting could be intensified to provide for the long-term stable economy sought by the residents.

Effective Co-ordination with Review and Regulatory Processes

The need to protect the environment of the Lancaster Sound region to ensure continued viability of hunting, trapping and fishing pursuits has been acknowledged by all interested parties. These concerns will form part of the environmental and socio-economic assessments of the various proposed industrial projects. For each of these assessments it will be necessary to design a project-specific review process. The terms and conditions under which particular projects will be allowed to proceed will be defined through these processes, which may include EARP hearings, Northwest Territories Water Board hearings, or the application of the Territorial Land Use Regulations. With so many ongoing reviews, decisions could be made that would not be consistent with the guiding regional planning objectives. Therefore, any regional planning body for Lancaster Sound must be aware of these complex operating conditions and develop a mechanism to effectively co-ordinate the various review and approval processes for development projects affecting the region.

VI. Beyond the Green Paper

To recapitulate, the green paper is the result of a study launched to examine and present to the public the full spectrum of issues concerning the people, environment, and resources of the Lancaster Sound region; it is against this background that decisions will be made on appropriate uses of the regions resources.

As a first step, a draft green paper was released in February 1981. The public review phase that followed provided valuable feedback about the questions the draft document posed on the future of the region. A clear consensus emerged that the final version should develop a range of specific resource use options and place more emphasis on regional planning.

Accordingly, the final green paper presents resource use options that cover the full range of possibilities identified during the public review and deals with regional planning considerations and the implications of the government's new northern land use policy for the region. Because the northern land use program is not yet operational, two planning process options are proposed to facilitate the early introduction of regional planning.

The public review also demonstrated that a consensus on the best future uses for the resources of Lancaster Sound does not yet exist. Strongly held convictions on the part of different sectors of the public and uncertainty about the nature of the eventual "Nunavut" land claims settlement prevent a consensus at this time. The discussion that the green paper intends to promote will, it is hoped, lead to broad agreement on the optimum plan for Lancaster Sound.

Many of the difficult and urgent issues bearing on the future on the region have been clarified by the green paper. The public interest in participating in planning generated by this exercise has greatly enhanced the climate for co-operation and decision-making.

To sustain the momentum and carry this climate of interest forward, six interim steps whose early implementation would facilitate the timely introduction of an effective planning mechanism and agreement on a best plan for Lancaster Sound are suggested:

1. The announcement of a policy statement on the pace and timing of new resource use activities in the Lancaster Sound region.
A clearly articulated policy statement on the timing for the introduction of new resource use activities is a key component of an integrated policy framework for the development of the North. The orderly evolution of a planning and management regime for Lancaster Sound would be greatly facilitated by such a policy decision. Specific planning objectives for the region could then be drawn up to guide subsequent resource use decision making with the time frame provided by the policy.

2. The development of a comprehensive conservation policy and strategy.
There is an urgent need to develop and implement a coherent system for identifying all environmentally significant areas in the Arctic and to determine the appropriate levels of protection required to preserve their respective environmental attributes. The formulation of a comprehensive conservation policy and strategy for implementation is seen as an important adjunct to the new land-use planning approach, one that would assist in striking a better long-term balance between non-renewable and renewable resource interests.

3. The immediate establishment of an ad hoc advisory body, with meaningful involvement of the region's Inuit inhabitants and other relevant sectors of the public.
The green paper exercise has heightened public awareness of the issues at stake and initiated a response from the Inuit residents and other interested sectors of Canadian society on the future uses and management of the Lancaster Sound region. This momentum can be sustained by enabling the Inuit and representatives of relevant interest groups to work together with government to continue the activities begun by the Lancaster Sound working group. This ad hoc committee would provide advice to the department regarding the further review of the green paper, and would remain active until a more formal planning forum for the Lancaster Sound region is established.

4. The initiation of an ongoing regional planning process before further proposals for resource use projects affecting the region are assessed.
The current practice of setting up a separate mechanism for the assessment of each individual resource use proposal often creates confusion, not only among the local residents but also among industry, private interest groups and the general public. It also frequently leads to duplication of effort by the proponents and the regulatory agencies. The main drawback of uncoordinated project reviews, however, is that they often define a scope for the assessment process which is far too narrow. The northern land use planning policy has been introduced in order to eliminate this piecemeal approach to resource use decision making. It follows, therefore, that a systematic planning process for Lancaster Sound should be in place before the implications of any further development project for the region will be assessed. Although project-specific reviews will continue to be necessary, their scope and terms of reference can then be coordinated through the planning mechanisms.

5. The provision for the modification of the membership and terms of reference of the planning body in accordance with a Nunavut claim settlement.
It is to be expected that the terms of settlement of the Nunavut claim will include provisions that will alter the present responsibilities for resource management in the Lancaster Sound region. Accepting from the outset the likelihood that the composition and the terms of reference of the planning body will need to be modified when agreement on the Nunavut claim is reached would enable these adjustments to be made with minimal loss of continuity.

6. The use of the tentative planning principles presented in Chapter V, in screening and evaluating all options for the future use of the region's resources.
These seven principles have already received a considerable degree of acceptance from all interested parties; they can therefore serve as performance criteria for assessing the resource use options that have been put forward in this document, or those which may be suggested in the public feedback following release of this paper.

May We Have Your Comments?
The strong public consensus on the need for effective regional planning that this study has brought about is expected to result in the initiation of a planning process for the Lancaster Sound region. Once set up, this process will continue the efforts of the Lancaster Sound Regional Study toward a "best plan" for the use and management of the region. The readers' reaction will assist in framing the terms of reference, composition and operational goals of the planning body.

Views on the resource use options will assist in determining the overall framework and scope for the regional planning process and its relationship to concurrent processes and events.

The review of the green paper will then be concluded by a meeting of representatives of the region's communities, followed by a public workshop. Detailed arrangements will be made public when they are completed. All input from the public will be carefully reviewed and will effectively contribute to the formulation of a balanced regional plan for Lancaster Sound.

Readers are requested to provide their comments to the department within a period of three months following the release of the green paper. All correspondence should be addressed to:

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Appendix A
Lancaster Sound: The Present Picture

In the Lancaster Sound region, the relationships between climate, natural processes, and economic activity are intricate. The harsh climate, for example, sets severe restrictions on industry, communications, and transportation. Industrial activities in turn may bring ecological change to the land and offshore areas, and may have a profound influence on the preferred lifestyle and aspirations of the region's Inuit inhabitants. Any process of planning for the future use of this unique environment, therefore, must be based on an understanding of its physical and biological characteristics and of the human activities that are carried on at present.

At this time, these factors and their interrelationships are still a long way from being completely understood. While some aspects have been studied intensively, others have been given very little attention in past research programs. Though unbalanced, the current level of knowledge about the Lancaster Sound region enables a broad review of potential uses of the region. Additional knowledge, as it becomes available, can be incorporated into the planning process to provide for better design for future projects or activities.

The following briefly outlines the present state of knowledge of Lancaster Sound, as it relates to the regional planning objectives. The physical make-up of the region is looked at, followed by a review of biological features, hunting, fishing and trapping, current commercial activities, and social and economic considerations; together they constitute "the present picture" of Lancaster Sound. Appendix B will look at potential and future uses and the influence they are expected to have on the region.

This complex region may be described fairly conveniently according to typical conditions encountered during winter and summer. In this context, winter is considered to correspond roughly to the period from October to May when the marine channels are ice-covered, and summer to the open-water season from June to September. This simplification aids in presenting the material in map format; however, the information given in the text takes into account the complex seasonal variability so characteristic of the region.

The "composite maps" in this appendix were derived from superimposed maps of the more important individual components. These smaller maps, which accompany the composite maps, were taken from the *Data Atlas*.

The Land and the Sea

The region's most prominent physiographic features are the rugged mountains of Bylot, eastern Devon, and northeastern Baffin islands, which rise to 1 500 m above the sea and are covered by glaciers and ice caps. In the central part of the study area, vast plateaus grade from 700 m on the southern Brodeur Peninsula to 300 m further west on Somerset and Devon islands. This gradual lowering of the relief continues on the islands west of Somerset, where lowlands are extensive and ridges do not exceed 230 m above sea level.

The lowlands throughout the area are sparsely covered with lichens, mosses, grasses, sedges, and a few stunted, dwarf shrubs. Slopes and upland plateaus, exposed to severe winds, are virtually devoid of vegetation.

The marine channels and inlets are bordered mostly by steep coastal cliffs and numerous fiords. Lancaster Sound itself is a smooth, broad trench with depths of 900 m at its eastern entrance, becoming gradually shallower towards the west until reaching a 180-m sill in Barrow Strait. Marine sediments consist mainly of gravel and sands in Barrow Strait and nearshore zones, grading to progressively finer silts and clays towards the mouth of Lancaster Sound and Baffin Bay.

The Region in Winter

Physical Environment

Three months of continuous darkness, from late November to early February, characterize the winter environment. The annual snowfall, which represents the main component of the area's relatively low precipitation, is about one metre. However, 1.5 m or more may fall on the rugged mountains of Bylot, Devon, and northern Baffin islands.

Snow cover persists in the region from mid-September to late May or June. Baffin Bay to the east has a moderating influence on air temperature, causing a noticeable gradient in mean annual temperature from east (-24°C) to west (-32°C).

Winds, currents, and ice-cover are extremely variable within the region and often unpredictable between seasons, years, and localities. Nonetheless, a number of general descriptive trends with significance to a regional study have been identified, with those suitable for mapping illustrated in Figures 4 and 5.

Ocean freeze-up begins along the shores by early October, and by December, the channels are normally ice-covered. Two distinct ice-cover regimes that strongly influence this winter environment are formed.

The sea ice of Baffin Bay and Lancaster Sound - the first regime - is unconsolidated throughout the winter; that is, it remains mobile, responding to currents, winds, and tides. As illustrated in Figure 4, ice drifts eastward in Lancaster Sound at average speeds of 5-10 km per day. The amount of unconsolidated ice-cover varies greatly, owing to continuous opening and refreezing of cracks, leads (long narrow openings), and patches of open water.

The winter sea ice in Barrow Strait - the second regime - is a relatively stable, consolidated mixture of new and multiyear ice, landfast for six months or more annually.

The ice edge that separates these two regimes usually appears near Prince Leopold Island across east Barrow Strait (near longitude 90°W). However, the position of the ice edge can vary considerably to the west or east.

In the vicinity of Resolute near Barrow Strait, wind direction varies considerably. However, no weather observations are taken in the Sound proper during winter and data from the eastern land stations are influenced by local topography.

Wildlife

The Lancaster Sound region, characterized by abundant and diverse wildlife populations, is probably the most biologically important area in the Canadian high Arctic. In the winter, the ice regimes as described in the previous section play a major role in determining the distribution, movements, and abundance of many species of birds and mammals.

The ice edge between consolidated (landfast) ice and unconsolidated (drifting) ice typically lies across Barrow Strait and extends eastward along the shores of Devon and Baffin islands. As Figures 6 and 7 illustrate, this edge provides a critical habitat for many species of animals. The ringed seal, for example, feeds and hauls out along the ice edge where it is also hunted by its main predator, the polar bear. The arctic fox frequents the same area, hunting seal or scavenging the carcasses of seals killed by polar bears. Many birds, and some whales, also congregat and feed along the fast-ice edge, particularly along th coast of southeastern Devon Island, from April to June. The ice edge forms a barrier to these animals, thus limiting their westward movements in spring.

From October to June, the drifting ice with its many cracks, leads, and patches of open water, provides valuable habitat for ringed seal, polar bear, and arctic fox. It is here that hundreds of thousands of birds co verge during April and May to feed and rest while waiting for the landfast ice to break up.

The consolidated ice of central and western Barrow Strait and the adjoining channels provides a platform where arctic fox, Peary caribou, and muskoxen cross throughout the winter. Areas of weak ice, often associated with zones of snow accumulation between pressure ridges or among rubble ice, are used by ringed seal for pupping and feeding.

Another feature that affects wildlife patterns is the for mation of snow banks along the coastlines of the region. Particularly on southern Devon and northern Somerset islands, snow banks are used extensively as maternity denning areas by polar bears and their cubs from mid-November to early April.

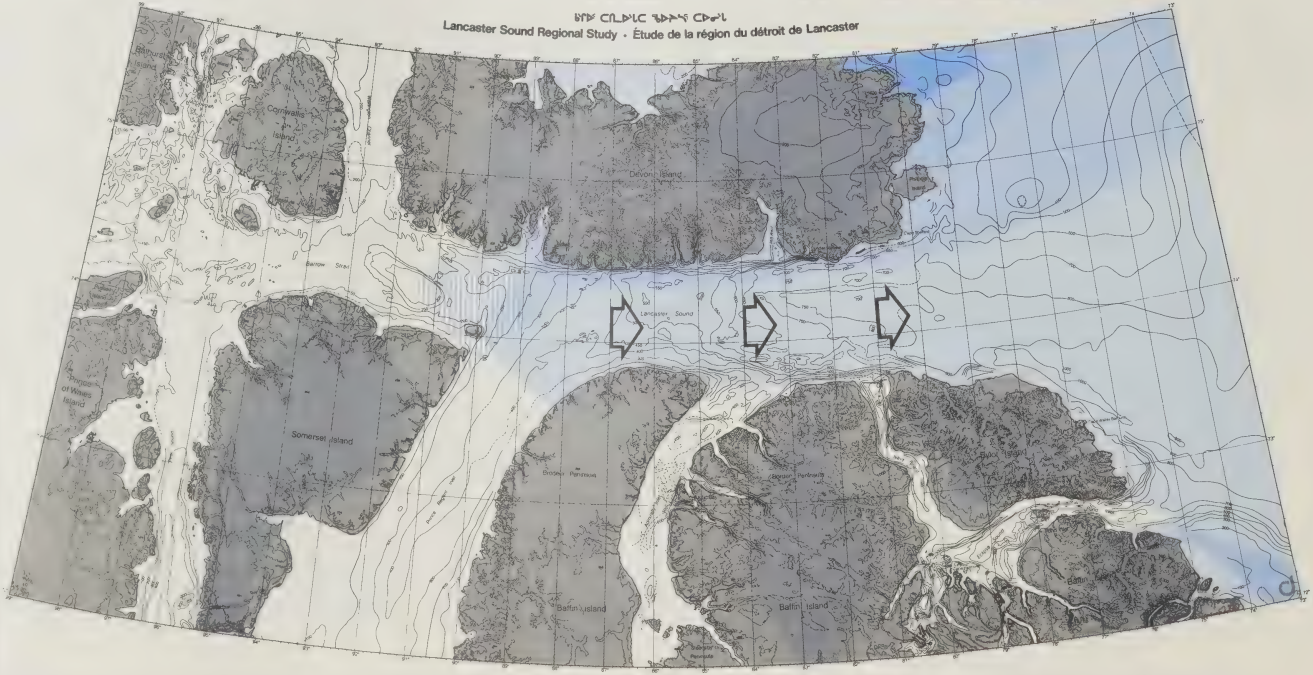
Muskoxen are mainly found on northeastern Prince o Wales Island, but small populations on Somerset, Cornwallis, Bathurst, and Devon islands use the lim-

Physical Environmental Characteristics: Winter • ᓄᓇᐅᑉ ᐃᒪᓐᓇᐃᓂᖅᑲᓂᕐᕆᑦ ᐅᑭᐅᖅ • Caractéristiques physiques et environnementales: hiver

Sea ice conditions range from complete ice cover (white) to open water (dark blue). Arrow = general ice movement. Position of fast-ice edge usually in hatched zone. Blue areas on land receive most snow.

ᑖᕐᕆᒪᐅᕐ ᓯᑯᓯᒪᓪᓕᐊᕐ ᐸᕐᑐᕐ ᐃᒪᖅᑲᐅᕐᓂᖅᑲᐸᓪᓗᓂᓗ ᐃᑎᔪᐊᓘᓐᓂᒃ. ᐃᒪᐅᕐ ᐃᕐᕆᕐ ᕿᓂᖓ ᓇᓗᓇᐃᕐᑕᐅᓯᒪᒻᒥᔪᕐ. ᐱᕐᑲᓗᔾᔭᖅᑲᐅᕐ ᐸᓪᓗᓂᓗ ᐃᒪᖅᑲᓂᕐᕆᓂ. ᑐᕐᔪᕐᑐᕐ ᓇᓗᓇᐃᕐᕈᑕᐅᓯᒪᔪᕐ ᓄᓇᒥ ᖃᓂᓂᐅᕙᓪᓗᒥᑦ

Les conditions de la mer de glace varient de l'état de couverture de glace (blanc) à l'état d'eau libre (bleu foncé). La flèche = mouvement général de la glace. Les zones raturées indiquent habituellement l'emplacement de la lisière de glace stable. Les zones bleues sur terre sont celles qui reçoivent le plus de neige.



Prepared by • Preparée par
The Lancaster Sound Regional Study Working Group,
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James Dobbin Associates Limited Coastal and Ocean Planners

Le groupe de travail d'études régionales de Lancaster Sound,
Ministère des Affaires indiennes et du Nord Canada et
James Dobbin Associates Limited, planificateurs, côtes et océans

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Kilometres • Kilomètres
Statute Miles • Milles terrestres
Nautical Miles • Milles marins
Contours in Metres • Lambert Conformal Conic Projection • Projection conique conforme de Lambert • Courbes de niveau en mètres

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Atlas—données 1982

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Physical Environmental Characteristics: Winter • ᓄᓇᐅ ᐃᒪᓐᓇᐃᓕᓴᕐᓂᖅ: ᐅᑭᐅᖅ • Caractéristiques physiques et environnementales: hiver

Selected Components • ᐅᓪᓗᖅ ᖃᐅᑕᐅᐊᒪᓗᒃ • Composantes choisies

1 Mean Annual Snowfall · ᐊᖏᔪᒪᒥ ᖁᓕᓴᕐᓂᖅ · Précipitations annuelles moyennes de neige

2 Median Ice Cover · ᓴᓪᖁᓕᓂᖅ · Couverture de glace médiane

3 Consolidated Ice Edges · ᓴᓇᒥᓴᖅ · Lisières de glaces consolidées: 1965, 1966, 1967, 1968, 1971, 1972, 1973, 1975, 1977

4 Ice Drift: Winter · ᓴᓴ ᐃᑎᖏᓐᓇ: ᐅᑭᐅᓴ · Glaces à la dérive: hiver

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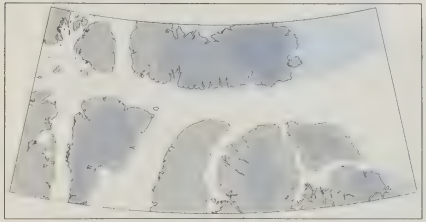

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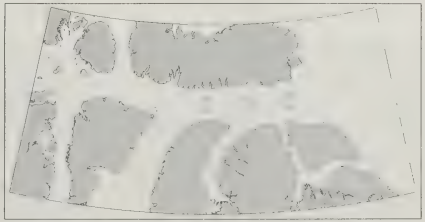

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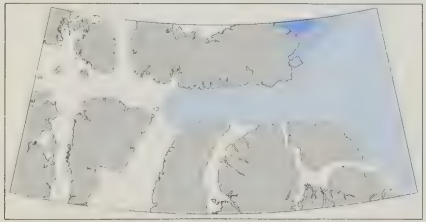

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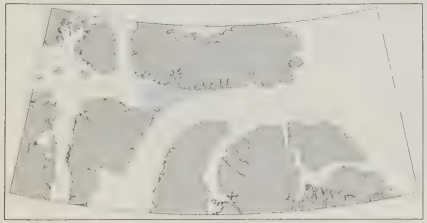
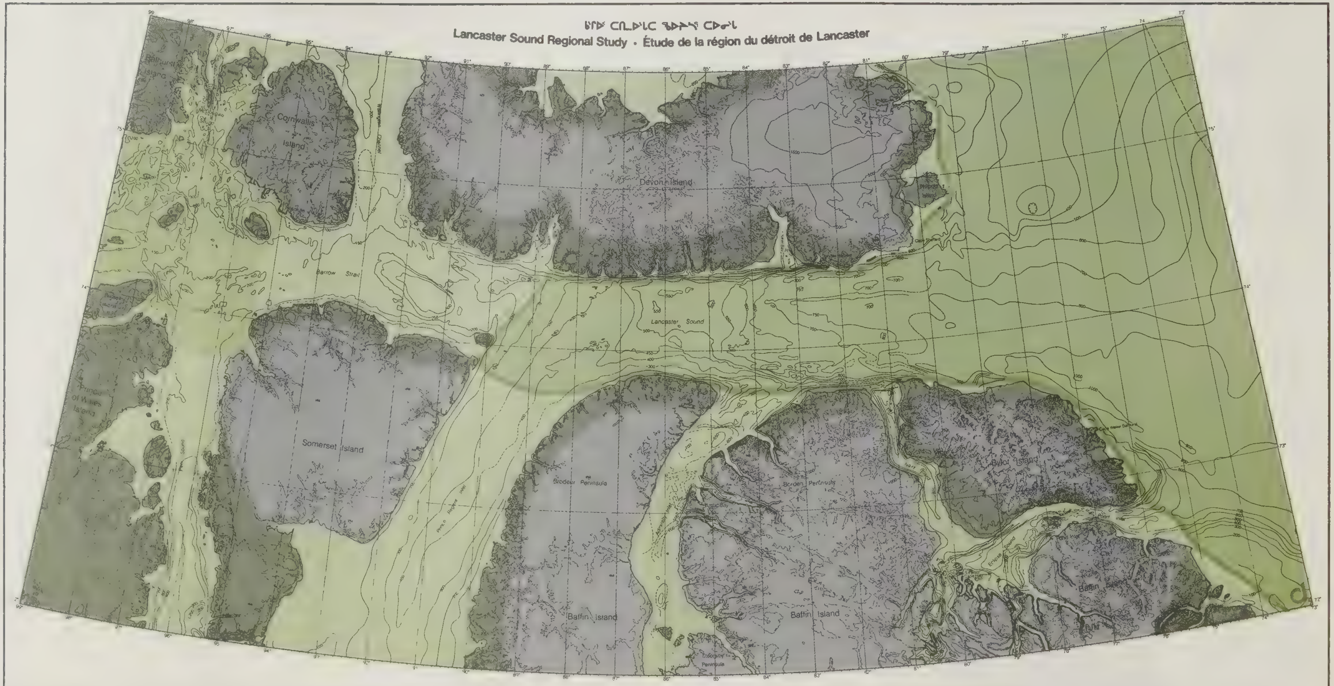


Biological Resources Characteristics: Winter • ᐆᒪᔪᐃᑦ ᓄᑕᐅᓯᕆᐊᕈᓐᓇᕐᓂᕐᒥᑕ ᐃᒪᓐᓇᐃᓯᒻᒪᓂᕐᒥᑦ: ᐅᑭᐅᖅ • Caractéristiques des ressources biologiques: hiver

Five levels of important habitats are shown for major species. Dark green areas are critical habitats for species that concentrate and feed along fast-ice edge. White areas are general range of one or two species.

ᓄᓇᒥ ᑕᓯᒪᐃᑦ ᓇᒧᓕᐅᔪᑦ ᐱᒻᒪᕆᐅᖕᓂᑦ ᐆᒪᔪᑦ ᓇᓄᓇᐃᕐᓯᒪᔪᑦ. ᑖᒃᑯᐊ ᑐᒃᔪᕐᓂᖅᓯᐃᑦ ᓇᓄᓇᐃᕐᓯᒪᔪᑦ ᐆᒪᔪᑦ ᓇᔪᓪᓚᕐᑎᓪᓗᑦ ᓄᓇᐅᑉ ᓯᒃᑯᓕᓂ ᐊᓂᒍᒪᔪᒃᑐᑦ. ᑖᒃᑯᐊᓗ ᖃᐅᔪᕐᑕᒥᒃ ᓇᓄᓇᐃᕐᓯᒪᔪᑦ ᑖᒃᑯᓄᓪᓚᑕᐃᓐᓂᖅ ᐆᒪᔪᑦ ᒪᕐᕈᐃᓕᓪᓗᓐᓄᑦ ᐊᑦᔨᒌᑦᑐᑦ ᓇᔪᓪᓗᔪᑦ.

Cinq niveaux d'habitats importants sont indiqués pour les principales espèces. Les zones en vert foncé sont des habitats critiques pour les espèces qui se concentrent et s'alimentent le long de la frange de glace ferme et les zones blanches représentent une aire générale frequentée par une ou deux espèces.



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Carte des ressources naturelles: bathymétrie 1:250 000 26140-A, 26145-A, 26240-A, 26245-A, 26310-A. Contours bathymétriques interprétés par Nancy N. Finlayson. Ottawa, le service hydrographique du Canada, Ministère des Pêches et Océans, 1976
Carte générale bathymétrie des océans (GEBCO) bathymétrie. Feuilles d'ébauche 1:1 000 000 N17 15, N17 16. Contours bathymétriques interprétés par David Monahan. Ottawa, le service hydrographique du Canada, Ministère des Pêches et Océans, 1979

References • Références
Data Atlas
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Atlas – donnees 1982

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Biological Resources Characteristics: Winter • ᐆᒪᔪᐃᑦ ᓄᑕᐅᓕᕆᐊᕈᕐᓈᓂᕐᒥᑕ ᐃᒻᒪᓇᐃᓕᕐᒪᓂᕐᒥᑦ: ᐅᑭᐅᖅ • Caractéristiques des ressources biologiques: hiver

Selected Components • ᐆᑦᑐᖅ ᖁᐅᑕᐅᔪᒪᓯᒪᔪ • Composantes choisies

1 Polar Bear · ᓇᓄᐃᑦ · Ours blanc

2 Ringed Seal · ᓇᑦᑎᑦ · Phoque annelé

3 Arctic Fox · ᖃᑯᖅᑕᑦ ᑎᕆᒐᓂᐊᑦ · Renard arctique

4 Marine Mammals: Spring Migrants · ᑕᕆᐅᕐᒥᐅᑕᑦ ᓅᔪᑎᑦ: ᐅᐱᕐᖑᖁᑦ ᑎᑭᖅᐸᒃᑐᐊᓯᑦ · Mammifères marins: migration printanière

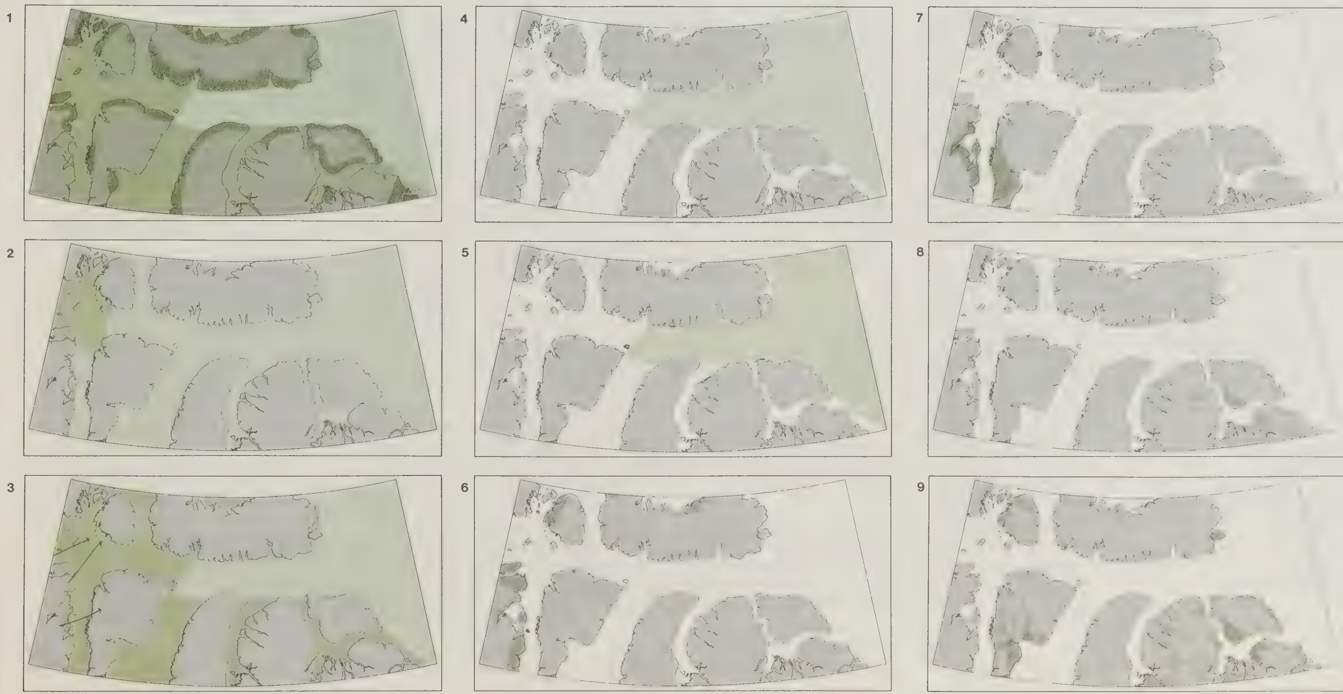
5 Colonial Seabirds · ᐅᑎᖅᑕᓱᑦ ᑎᖕᒥᐊᑦ · Oiseaux coloniaux

6 Muskoxen · ᐅᒥᖕᒪᑦ · Boeuf musqué

7 Peary Caribou · ᖃᑯᖅᑕᑦ ᑐᑦᑐᐃᑦ · Caribou de Peary

8 Barren-Ground Caribou · ᓇᐸᖅᑐᖃᙱᑦᑐᒥᐅᑦ ᑐᑦᑐᐃᑦ · Caribou de la toundra

9 Vegetation · ᐱᕈᖅᑐᖃᓂᖓ · Végétation



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ited areas of well-vegetated lowlands found on these islands. Peary caribou move between Prince of Wales and Somerset islands during winter; some may also cross Barrow Strait.

Hunting, Fishing and Trapping
As the wildlife of the region is finely adapted to the dynamics of this harsh land, so too the native hunter must be attuned to seasonal change in the natural environment to earn his livelihood. Hunting, trapping and fishing have been, and remain, important pursuits for the region's Inuit in the winter.

Except for December and January, when darkness and extreme cold interfere, winter is the most important period for Inuit hunters and trappers. Figures 8 and 9 show where hunting, fishing and trapping may occur in this season. With the snowmobile, hunters can cover extensive areas of snow-covered land and sea-ice. The harvested animals include ringed seal, narwhal, caribou, muskoxen, polar bear, arctic fox, and small game. Fishing for arctic char through the ice also takes place.

Ringed seals are hunted at breathing holes and ice cracks in fast ice areas during winter, and on sea ice or along leads and ice floes in April, May and June. This is the most important species harvested during this period as it is abundant and highly valued for its meat and pelt.

Caribou, the preferred food source, are hunted in the early and late winter months (November and March to May) when travel and light conditions are amenable. Hunters travel long distances: Pond Inlet residents going southwest to Eclipse Sound, Arctic Bay people to southern Admiralty Inlet, and Resolute hunters to Somerset and Prince of Wales islands.

Muskoxen, too, have recently become a source of food and income for Resolute people, who harvest a small quota on Devon and Prince of Wales islands.

The permanent residents of Somerset Island hunt on the island and in the area of Creswell Bay.

Polar bear are hunted for their hides on the sea ice and along the floe edges. Quotas on polar bear are established by the government of the Northwest Territories. They are occasionally modified, following consultation with local hunters' and trappers' associations.

Small game such as arctic hare, ptarmigan, seabirds, and migratory waterfowl adds welcome variety to the Inuit diet, so these species are eagerly hunted.

Inuit trappers tend their arctic fox traplines most of the winter on landfast ice and along the coast. Depending on the abundance of the animals and the current price of their fur, arctic fox trapping is an important source of income in all native communities.

Current Commercial Activities
In the winter, mining of lead and zinc at Nanisivik and air transportation operations serving Resolute, Nanisivik, and Pond Inlet (Figures 10 and 11) are the main commercial activities.

Mining at Nanisivik on Strathcona Sound began in 1976 and at present employs 225 people. Inuit constitute 25 per cent of this work force. Although the mining facilities occupy an area of only 10 km², including storage and operating facilities, townsite, and associated activities, such as shipping docks, roads, airstrip, and tailings disposal site, the environment may be affected over a much wider area as a result of noise and air pollution and icebreaker-assisted shipping. Environmental effects are poorly documented. Operations here are year-round with the concentrates stockpiled until the summer.

In 1978, a representative year, Nanisivik produced 128 400 tonnes of zinc concentrate and 11 500 tonnes of lead concentrate, representing about 7.1 and 2.4 per cent of the total Canadian production, respectively. The mine has a life expectancy of about eight more years unless another economic ore body is discovered nearby.

The Arvik mine on Little Cornwallis Island is scheduled to start production in 1982. Annual exports of about 270 000 tonnes of zinc concentrate and 45 000 tonnes of lead concentrate are anticipated.

Air transportation is essential to the communities and mines for supply of perishable foods and urgently needed cargoes as well as intercommunity travel. Important medical, dental, and educational services in Frobisher Bay and southern Canada can only be reached by air; technical personnel to operate and maintain certain equipment can only enter the region this way. Scheduled flights are available several times a week.

The Region in Summer

Physical Environment
The arctic summer brings continuous daylight from early May to early August, but the mean daily temperature rises only slightly above freezing in July and August because of the influence of the cold surface waters. For about two to three months, the Lancaster Sound region experiences open water but the length of the period varies greatly from year to year for various locales according to prevailing weather and ocean conditions.

Most of the rainfall occurs in July and August with the average summer total being only 75 mm throughout the region except for slightly higher amounts in the eastern mountainous areas of Devon Island. Extensive fog is common over the marine channels, particularly in late summer.

At this time of year, prevailing winds are from a north to northwest direction in the western end of Lancaster Sound near Resolute, whereas in the Sound proper they vary considerably.

The circulation of surface waters in the Sound is predominantly from west to east but a persistent eastward current follows its southern margin. This flow is complicated by a number of incursions at most channels (such as Prince Regent and Admiralty inlets) and by the presence of mid-channel eddies, as shown in Figures 12 and 13. At the Sound's exit into Baffin Bay, a large anticlockwise intrusion of Baffin Bay surface water penetrates, sometimes as far westward as 100 km.

In May, the unconsolidated ice in the Sound loosens. An open-water area, which starts to develop along southern Devon Island, normally becomes continuous through to Baffin Bay by mid-June. The consolidated ice further west is slower to decay as is that of the inlets and bays adjoining the Sound. Regardless of the geographic position of the consolidated ice edge, however, its breakup generally commences in mid-July. Lancaster Sound is nearly always ice-free during August and September.

Icebergs, numbering in the hundreds and greatly varying in size, drift into the eastern entrance of Lancaster Sound, but like the intrusive current in which they drift, seldom penetrate more than 100 km before returning to Baffin Bay.

Summer in the Lancaster Sound region is thus characterized by highly variable weather and ice conditions, complex surface-water circulation patterns, and the presence of numerous icebergs in the eastern portion of the Sound. The earlier ice breakup and the relatively longer open-water season in the eastern part of the Sound, together with the complex surface water currents, contribute to the overall biological productivity of this marine environment.

Wildlife
During the brief summer season, abundant plant and animal life is evident throughout the marine area and much of the coastline (Figures 14 and 15). As the region's channels, well-vegetated lowlands, valleys, and shorelines become free of snow and ice in the spring, they are used by more than 50 species of birds during migration and feeding, breeding, and moulting.
Colonial seabirds, which nest on coastal cliffs in various locations from late April until September, are little affected by ice-cover. Nine major seabird colonies are occupied by murres, fulmars, kittiwakes and guillemots, which together with a number of other species, total a third of eastern Canada's 8.3 million breeding colonial seabirds. Tens of thousands of eider and oldsquaw ducks, snow geese, loons, and shorebirds appear here.

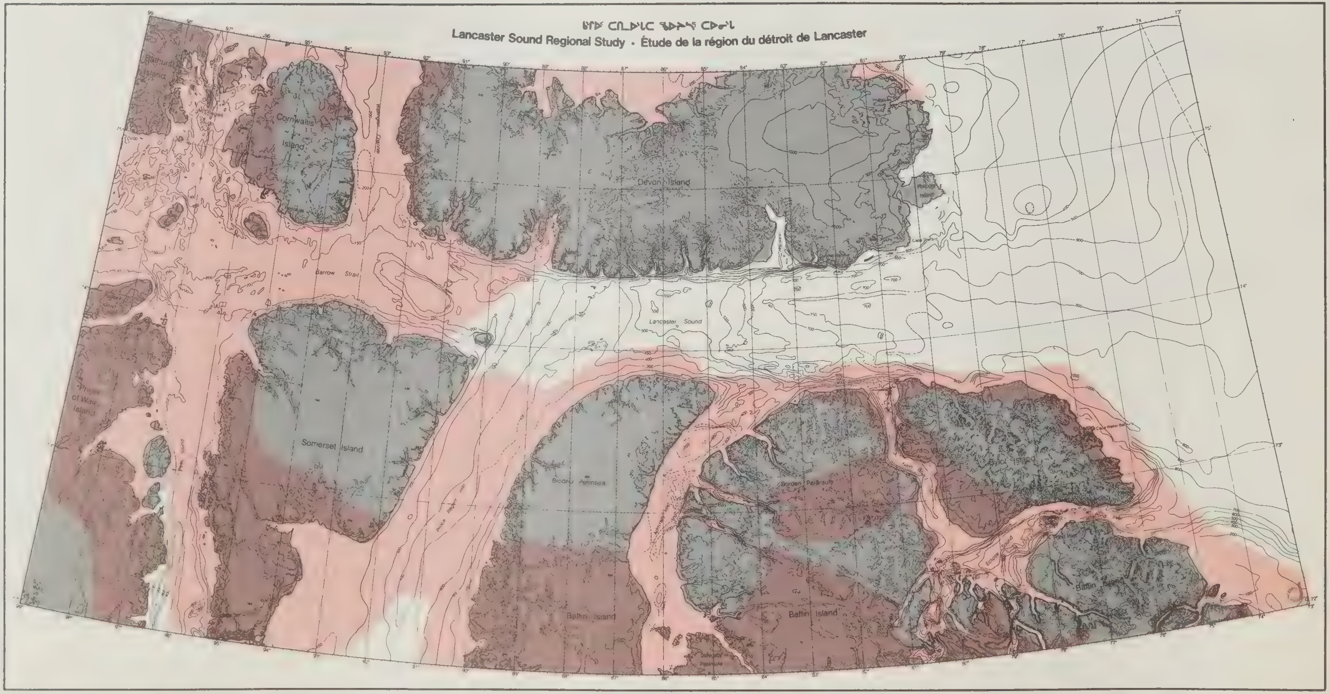
The abundant ringed seal, which are permanent residents of these waters, are joined in summer by the endangered bowhead whale, most of the world's nar-

Hunting, Fishing and Trapping Patterns: Winter • ᐊᖑᓇᓱᒃᓱ ᓂᕆᓚᔭᐅᕙᒃᑐᑦ, ᐃᖃᓗᒃ ᓯᐅᕋᓱᒃᓱ ᓂᕆᓚᔭᐅᕙᒃᑐᑦ ᐊᒻᒪ ᑮᔭᖅᑳᑦᑕᓕᓱᒃ ᐱᐅᕙᒃᑐᑦ ᒪᓕᒃ ᐸᒃ ᑕᕐᕆᑦ: ᐅᑭᐅᖅ • Chasse, pêche et piégeage: hiver 1974-1982

Red colour indicates areas where Inuit commonly harvest wildlife. Key species harvested are shown in Figure 9.

ᐊᐅᐸᖅᑐᒥ ᑎᑎᖅᓯᒪᔪᑦ ᓇᓗᓇᐃᖅᓯᒪᒍᑕᐅᔪᑦ ᐃᓄᐃᑦ ᐅᖑᓇᓱᒃᐱᒋᒥᓇᐅᔭᖅᑕᕆᓂ. ᐆᒪᔪᑦ ᐊᖑᓇᓱᒃᑕᐅᓂᖅᐸᐅᕙᒃᑐᑦ ᓇᓗᓇᐃᖅᑕᐅᓯᒪᔪᑦ 9,ᒥ.

Les régiones en rouge indiquent les zones où les Inuit chassent couramment la faune. La figure 9 indique les principales espèces chassées.



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Kilometres • Kilomètres
Statute Miles • Milles terrestres
Nautical Miles • Milles marins
Contours in Metres • Lambert Conformal Conic Projection • Projection conique conforme de Lambert • Courbes de niveau en mètres

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Data Atlas
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Atlas—données 1982

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Hunting, Fishing and Trapping Patterns: Winter • ᐊᒡᒍᓇᓯᓐ ᓂᕆᔭᐅᕙᒃᑐᑦ, ᐃᖃᓗᒃ ᓯᐅᕋᓯᓐ ᓂᕆᔭᐅᕙᒃᑐᑦ ᐊᒻᒪ ᑮᔭᖅᑳᑕᓚᓯᓐ ᕓᐅᕙᒃᑐᑦ ᒪᓂᒃ ᐸᒃ ᑕᕐᕆᑦ: ᐅᑭᐅᖅ • Chasse, pêche et piégeage: hiver 1974-1982

Selected Components • ᐆᒃᑐᖅ ᖁᐅᑕᐅᔪᒪᓯᒪᔪ • Composantes choisies

1 Seal Hunting · ᓇᑦᑎᖅᓯᐅᖅᐱᑦ · Chasse au phoque

2 Polar Bear Hunting · ᓇᓅᖅᓯᐅᐱᑦ · Chasse à l'ours blanc

3 Caribou Hunting · ᑐᒃᑐᓯᐅᖅᐱᑦ · Chasse au caribou

4 Trap Lines · ᒥᑭᓕᐊᖅᖂᐱᑦ · Lignes de piégeage

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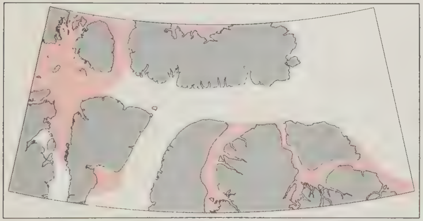

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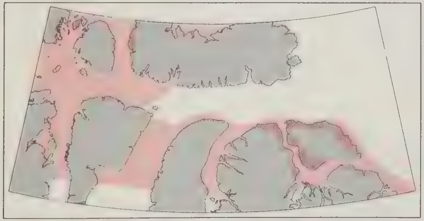

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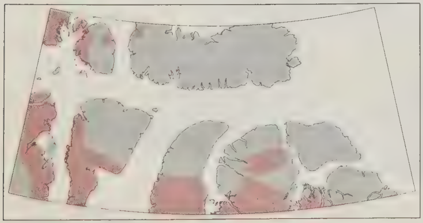

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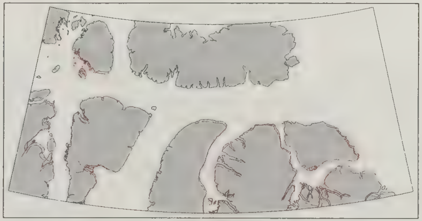

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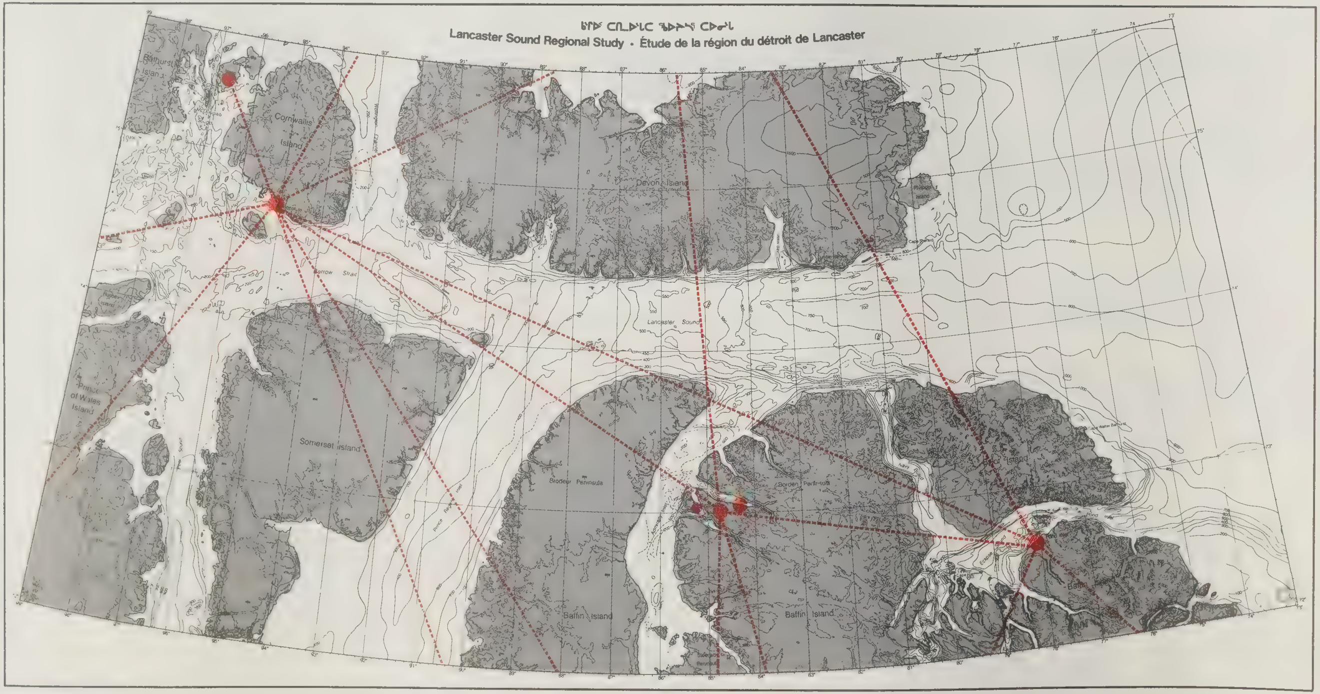
Current Commercial Activities: Winter • ᒫᓐᓇᐅᔪᖅ ᑮᓇᐅᑦᔭᒃᓴᐳᑕᐅᓇᓱᐊᖅᑐᑦ: ᐅᑭᐅᖅ • Activités commerciales actuelles: hiver

Commercial activities include mining of lead-zinc ore and air transportation operations.

ᑮᓴᐅᔾᔭᒃᓴᐅᑎᐅᔪᑦ ᐃᓚᖏᑦ ᓇᓄᔭᓇᖏᓐᓂᖅ ᐊᕿᑦᑑᔭᒥᒃ ᓴᕕᖃᔾᔭᒥᒃ, ᑳᓐᓱᐅᔭᕐᒥᒃ, ᐊᒻᒪᓗ ᖃᒃᑕᓯᑯᑦ ᐊᐅᓪᓚᑕᕐᑐᓂᒃ ᑲᒪᓂᕐᒥᒃ.

Les activités commerciales comprennent l'exploitation minière du plomb et du zinc ainsi que des opérations de transport.



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Kilomètres — Kilomètres
Statute Miles — Milles terrestres
Nautical Miles — Milles marins

Contours in Metres • Lambert Conformal Conic Projection • Projection conique conforme de Lambert • Courbes de niveau en mètres

References • Références
Data Atlas
Atlas—données 1982

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Current Commercial Activities: Winter • ᒫᓐᓇᐅᔪᖅ ᑮᓇᐅᑦᔭᒃᓴᕈᑕᐅᓇᓱᐊᖅᑐᑦ: ᐅᑭᐅᖅ • Activités commerciales actuelles: hiver

Selected Components • ᐆᒃᑐᖅ ᖁᐅᑕᐅᔭᒦᓯᒪᔭ • Composantes choisies

1 Mining · ᐅᔭᖅᑕᖅᓂᐊᖅᕕᑦ · Mines

2 Air Transport · ᖃᖓᑕᓲᑦ ᐊᖅᑯᑎᖏᑦ · Transport aérien

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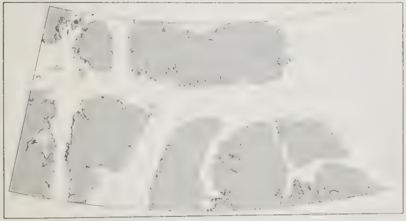

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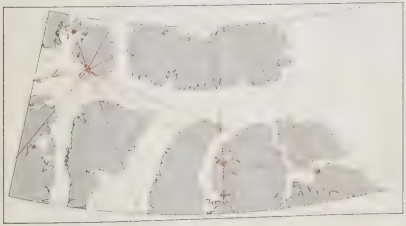
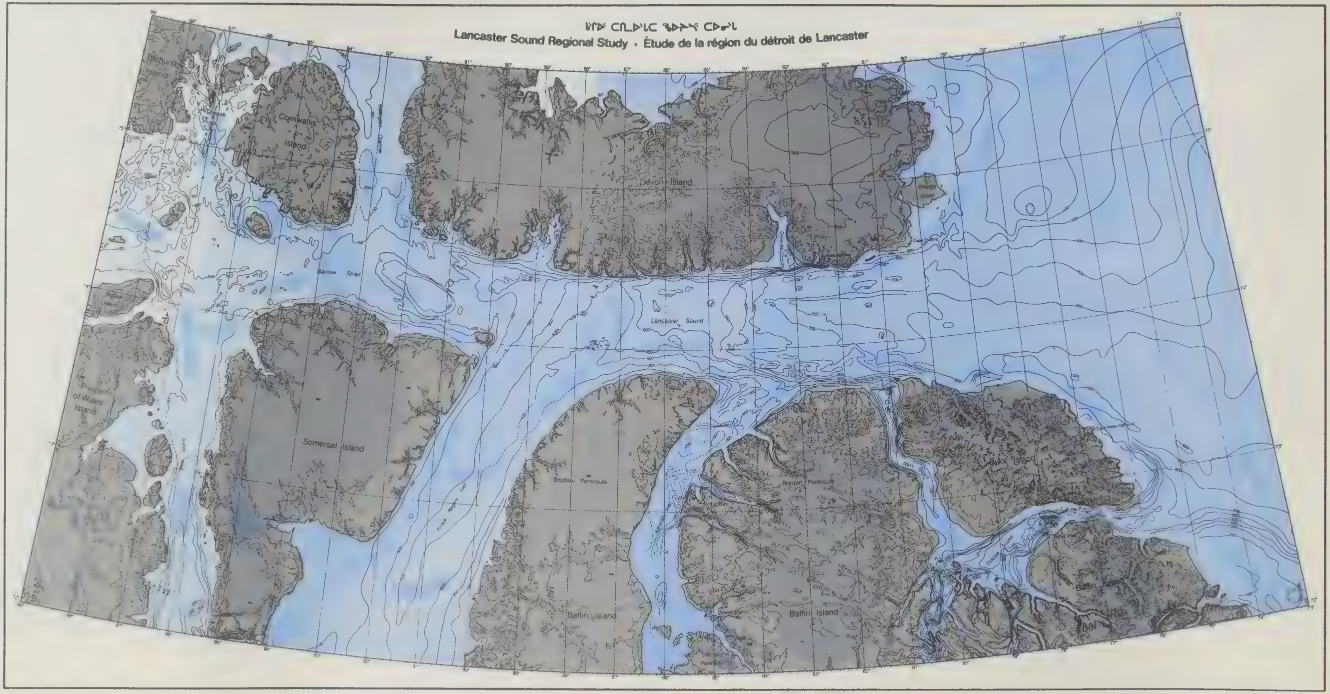


Physical Environmental Characteristics: Summer • ᓄᓇᐅᑉ ᐃᒪᓐᓇᐃᓕᒃᑲᓂᕐᒥᑦ: ᐊᐅᔭᖅ • Caractéristiques physiques et environnementales: été

Sea ice conditions range from partial ice cover (light blue) to open water (dark blue). Icebergs are most frequent in hatched areas. Surface water circulation is shown by arrows. Blue areas on land receive most rainfall.

ᑕᕐᕆᐅᕐ ᓱᒡᖃᕈᔪᓱᕐ ᑮᒡᖄᕐᒥᑦᑎᐊᕐᐸᓪᓗᓂᓗ. ᐱᕐᑲᓗᔾᖃᐅᕐᐸᓪᓗᓂᓗ ᑕᕐᕆᐅᕐᒥ. ᐃᒪᕐᖃᐅᕐᓂᐊ ᓇᓗᓇᐃᕐᓱᒪᒥᔪᕐ. ᑖᒃᑯᐊᓗ ᑐᕐᖁᔪᕐᑐᒥᒃ ᓇᓗᓇᐃᕐᓱᒪᔪᑦ ᒪᕐᑯᐱᐅᓗᐊᕐᐸᓪᓂᕐᒥᑦ ᓄᓇᒥ.

Les conditions de la mer de glace varient de l'état partiel de couverture de glace (bleu clair) à l'état d'eaux libres (bleu foncé). Les icebergs se trouvent le plus fréquemment dans les zones raturées. Les flèches indiquent les courants d'eau de surface. Les zones bleues sur terre sont celles qui reçoivent le plus souvent des précipitations.



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Physical Environmental Characteristics: Summer • ᓄᓇᐅᑉ ᐃᒫᓇᐃᓂᖓᓂᑦ: ᐊᐅᔭᖅ • Caractéristiques physiques et environnementales: été

Selected Components • ᐆᑐᖅ ᕿᐅᑕᐅᓂᒪᓯᒪᓂ • Composantes choisies

1 Rivers and Lakes · ᑯᑦ ᑕᓯᓪᓗ · Cours d'eau et lacs

2 Ice Cap · ᐊᐅᓂᐃᑦᑐᖅ · Calotte glaciaire

3 Mean Annual Rainfall · ᐊᕿᒍᑕᒪᒥ ᒫᑯᓯᖑᓂᖓ · Précipitations annuelles moyennes de pluie

4 Surface Water Circulation · ᐃᒪᐅᑉ ᖃᖓᑕ ᐃᖏᕿᓂᖓ: ᐊᐅᔭᖑᑦ · Courants de surface

5 Median Ice Cover · ᓯᑯᖃᖅᓂᖓ · Couverture de glace médiane

6 Icebergs · ᐱᖃᓗᔭᐃᑦ · Icebergs

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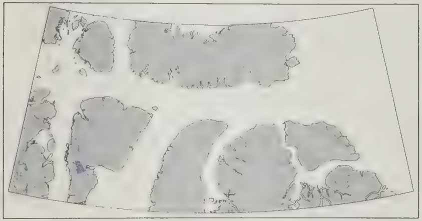

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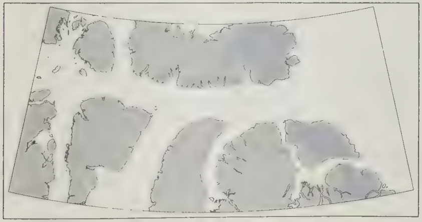

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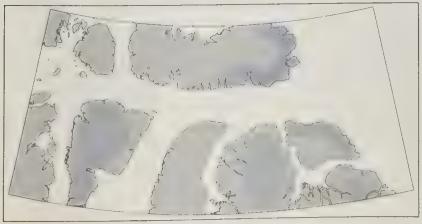

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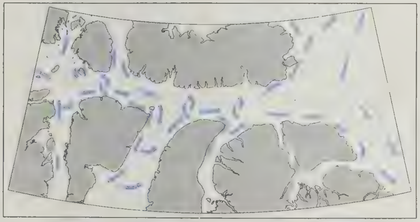

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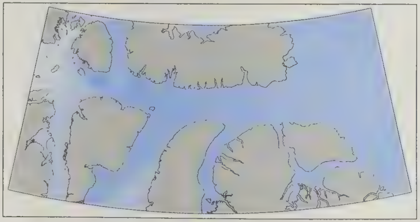

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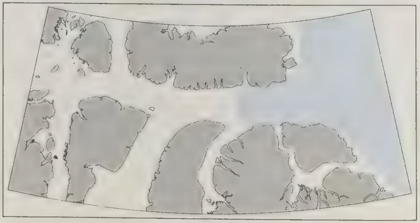


whal population, a third of North America's white whales, as well by walrus, and harp and bearded seal. Arctic char are found in several streams, lakes and rivers, while arctic cod are abundant throughout the marine areas.

In summer, there is also considerable wildlife activity on land (see Figure 14). The coastal lowlands, in particular, are occupied by nesting waterfowl and shorebirds, polar bear, who favour these locations as summer retreats, caribou, and muskoxen. Barren-ground caribou are found in small numbers on northern Baffin Island, while Peary caribou range on Prince of Wales and northwestern Somerset islands, and to a lesser extent on northern Cornwallis and Bathurst islands. Muskoxen occupy, year-round, the well-vegetated lowlands on Prince of Wales, Devon, Cornwallis, and Bathurst islands.

Although it is necessary to recognize the importance of the whole region as a wildlife habitat, there are some areas that merit special mention. The coastal lowlands and nearshore waters of southeastern Devon Island and Philpots Island, together with the coastal areas and adjacent waters of the Borden Peninsula and Bylot Island, are perhaps the most important habitats in the region in terms of species diversity and bird and mammal population densities. The north and east coasts of Somerset Island, including the Creswell Bay area, the southwest coast of Devon Island, Admiralty Inlet, and McDougall Sound are also of major consequence to ducks, geese, colonial seabirds, and marine mammals. Prince Leopold Island and Cape Hay on northern Bylot Island are particularly important nesting locations for colonial seabirds, whereas the Wollaston Islands are a significant walrus habitat.

On the other hand, the Devon Island plateau, central Somerset Island, and the Brodeur Peninsula are very sparsely used by wildlife.

Hunting and Fishing

Hunting activities are intensive during the brief summer period, with many families dispersing to seasonal camps located at varying distances from the communities. Areas where hunting or fishing may occur during the summer are shown in Figures 16 and 17. Comparison of the composite maps for winter and summer (Figures 8 and 16) shows that the area hunted in summer is much smaller. This is, in part, related to difficulties of travel overland and over open water.

Marine mammals are hunted in the coastal waters of Bylot and northern Baffin islands as well as in the coastal areas of Cornwallis and southern Somerset islands. Ringed seal are consistently available and are used for food, clothing, and sale of skins. They are hunted offshore from small boats near the communities and from seasonal camps. Resolute people hunt principally around Cornwallis Island and McDougall Sound, and east as far as Radstach Bay on Devon Island. Some families camp on Somerset Island and hunt along the island's coastal areas. As well, the permanent population of Somerset Island hunts in the area of Creswell Bay. The Arctic Bay people work from the floe edge north of Admiralty Inlet and, after the ice retreats, hunt throughout the inlet. Pond Inlet people hunt at the floe edge near Button Point and Cape Graham Moore until the ice recedes, at which time they use Eclipse Sound and Navy Board Inlet. Other species such as bearded and harp seals are taken by Inuit whenever encountered.

White whale and narwhal are hunted from boats during the open-water season. Numbers taken vary considerably from year to year. White whales are more available in Resolute and Creswell bays and the western part of the Lancaster Sound region. In late June, the Inuit of Pond Inlet begin hunting the narwhal along the floe edge about 75 km east of the community, near Cape Graham Moore and Button Point. As the whales continue westward, they are hunted by residents of Arctic Bay and the outpost camp on Creswell Bay. The narwhal is hunted for the valuable ivory of its tusk and for its skin, called muktuk, which is eaten.

Walrus are hunted by the people of Pond Inlet in the Wollaston Islands, an important hunting area; the walrus ivory is used for carving and some of the meat for food.

Since travel over the tundra in summer is arduous,

caribou hunting is confined to short distances inland from shorelines accessible by boat from settlements or seasonal camps. Caribou meat is a preferred component of the Inuit summer diet and the skins are used to make warm winter travelling clothes. However, owing to the irregular movements of the caribou herds, availability varies considerably from year to year. Generally, Pond Inlet Inuit hunt around Eclipse Sound, Arctic Bay hunters use the southern portion of Admiralty Inlet, and Resolute people hunt on Somerset Island.

During hunting excursions for caribou and other animals, Inuit also take small game, particularly migratory waterfowl, as well as ptarmigan and seabirds.

Fishing through the ice of freshwater lakes for arctic char begins in May and continues into the summer along coastal margins and in the mouths of rivers and streams. Summer camps are often favourable sites for this pursuit. Small-scale commercial fishing of arctic char for sale in the settlements is carried out.

Current Commercial Activities

During summer, a variety of commercial activities takes place in the Lancaster Sound region including mining, shipping, scientific surveys, tourism, and air support operations. Although much of eastern Lancaster Sound is held under oil and gas permits, there is no drilling under way at present. As Figures 18 and 19 show, most commercial activities occur in the eastern part of the region.

Mining involves the extraction and concentration of lead and zinc ores, and their export by ship to Europe. The Nanisivik mine has been in operation since 1976 and the Arvik mine, currently being developed on Little Cornwallis Island, is scheduled to begin production by 1982.

Shipping activities also serve to bring supplies to communities. At present, there are about 70 ship transits each year, servicing both the communities and the mining operation at Nanisivik. In 1978, 1 685 tonnes of dry cargo, and 5 155 tonnes of bulk fuels were transported in eight resupply voyages. During the same year, six shiploads of ore were exported from the Nanisivik mine. An increased number of voyages were made in 1980 to support the construction of the Arvik mine. Supply ships and ore-carriers are often accompanied by Canadian Coast Guard icebreakers.

A few vessels involved in survey projects travel through the Northwest Passage each summer. The Vessel Traffic Centre in Frobisher Bay, operated by the Canadian Coast Guard, is responsible for monitoring ship movements and enforcing prescribed standards with respect to ship safety and pollution prevention.[1]

Government and industry scientists conduct terrestrial and marine surveys to ascertain resource potentials or to investigate environmental characteristics. For example, in the 1979-80 season, 74 field teams were involved in research and surveys, most of which dealt with biological or geological topics.

As discussed in "The Region in Winter," air transportation is important for intercommunity travel and the transportation of residents to medical, dental, and educational services in Frobisher Bay or southern Canada. Aircraft also supply perishable foods and urgently required supplies and provide access to the area for technical personnel who are required to maintain equipment or machinery. Most of the tourists who visit the region in summer arrive by air.

Tourism is a major activity in Pond Inlet with the attraction of arctic char fishing on the nearby Robertson River and adjacent Koluktoo Bay. Sport fishing could also become more important to other communities. Resolute currently supports one locally based tourist operation, and serves as a staging point for occasional tours to Ellesmere Island and the North Pole. Tourism is a source of seasonal income to the com-

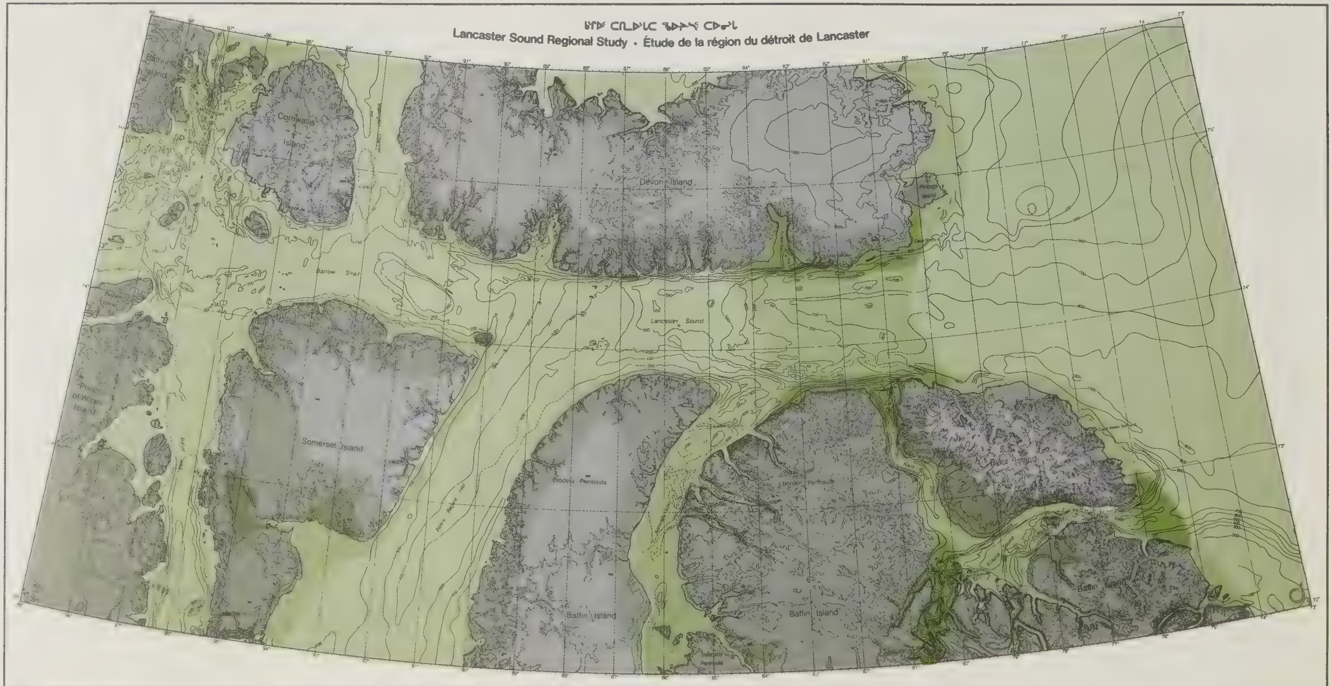
[1]The Arctic Waters Pollution Prevention Act prohibits the deposit of any waste in arctic waters. The act also authorizes the promulgation of shipping safety control zones and regulations that prohibit a ship of any class from navigating in a safety control zone unless it complies with prescribed standards.

Biological Resources Characteristics: Summer • ᐆᒪᔪᐃᑦ ᓄᑕᐅᓕᕆᓚᐊᕈᓐᓇᖅᓯᒥᑕ ᐃᒪᓐᓇᐃᓕᖓᓂᖅᒥᑦ: ᐊᐅᔭᖅ • Caractéristiques des ressources biologiques: été

Five levels of important habitats are shown for major species. Darker green areas indicate an increasing overlap of important habitats. White areas are general range of one or two species.

ᓇᕝᕕᐅᕝᕙᑦ ᐱᓪᒪᕆᐅᓂᖅᓴᓐ ᐆᒪᔪᓐ ᓇᓗᓇᐃᖅᓯᒪᕙᑦ. ᑐᒃᑐᕐᓂᖅᓴᐃᑦ ᓇᓗᓇᐃᖅᓯᒪᕙᑦ ᖃᐅᔨᒋᐊᖅᑲᖅᓴᐅᕙᑦ ᐆᒪᕙᑦ ᐊᒃᑭᕙᑕᐅᓂᖅᓵᑦ ᓇᕝᕕᒋᓐᓂ. ᖃᐅᓪᓗᖅᓂᖏᑦ ᓇᓗᓇᐃᖅᑭᑎᑦ ᒪᕐᕈᐃᑦ ᐊᑉᐱᕆᓯᑐᑦ ᐆᒪᕙᑦ ᓇᕝᕕᒋᓐᓂ.

Cinq niveaux d'habitats importants sont indiqués pour les principales espèces. Les zones en vert foncé indiquent un chevauchement de plus en plus prononcé d'habitats importants. Les zones blanches sont généralement fréquentées par une ou deux espèces.



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Statute Miles • Milles terrestres
Nautical Miles • Milles marins
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Atlas–données 1982

14

Biological Resources Characteristics: Summer • ᐆᒪᔪᐃᑦ ᓄᑕᐅᓕᕆᒪᐊᕈᓐᓇᕐᓂᕐᒥᑕ ᐃᒪᓐᓇᐃᓕᕐᒐᓂᕐᒥᑦ: ᐊᐅᔭᖅ• Caractéristiques des ressources biologiques: été

Selected Components • ᐆᔾᑐᖅ ᖁᐅᑕᐅᔪᒪᓯᒪᔪ • Composantes choisies

1 Polar Bear · ᓇᓄᐃᑦ · Ours blanc

2 Walrus · ᐊᐃᕕᐃᑦ · Morse

3 White Whale (Beluga) · ᖃᑯᖅᑕᑦ ᕿᓚᓗᒐᐃᑦ · Béluga

4 Narwhal · ᑐᒐᓕᑦ ᕿᓚᓗᒐᐃᑦ · Narval

5 Marine Mammal Migration · ᑕᕆᐅᕐᒥᐅᑦ ᓂᕐᔪᑎᑦ ᐃᑎᕐᖁᑎᕆᕝ ᑕᕐᑎᑦ · Migration des mammifères marins

6 Colonial Seabirds · ᐅᑎᖅᑕᔾᔪᑦ ᑎᖕᒥᐊᑦ · Oiseaux coloniaux

7 Peary Caribou · ᖃᑯᖅᑕᑦ ᑐᒃᑐᐃᑦ · Caribou de Peary

8 Snow Goose · ᖃᒍᐃᑦ · Oie blanche

9 Birds · ᑎᖕᒥᐊᑦ · Oiseaux

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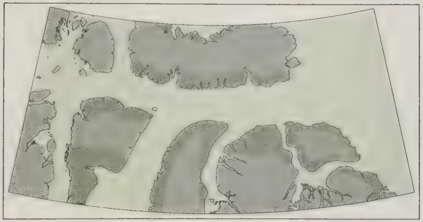

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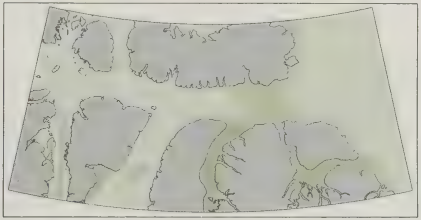

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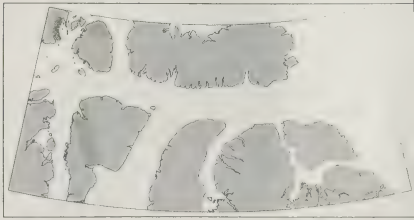

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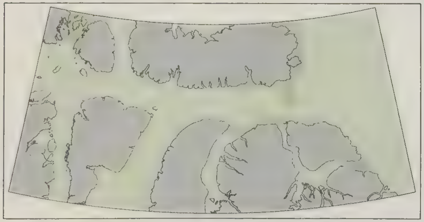

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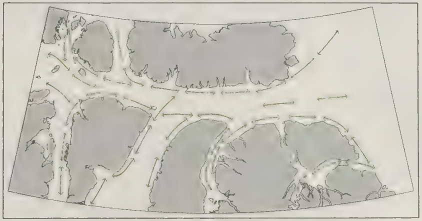

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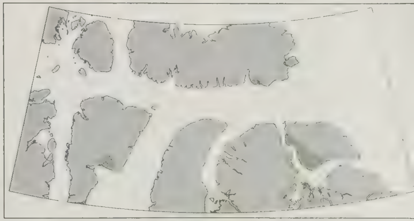

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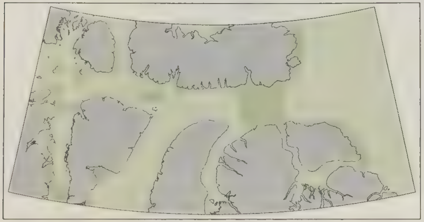

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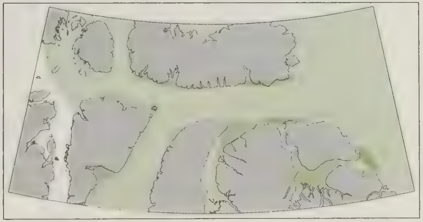

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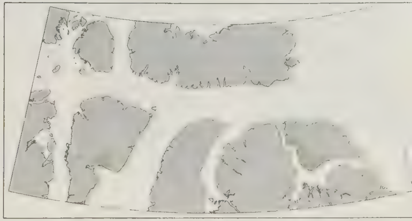
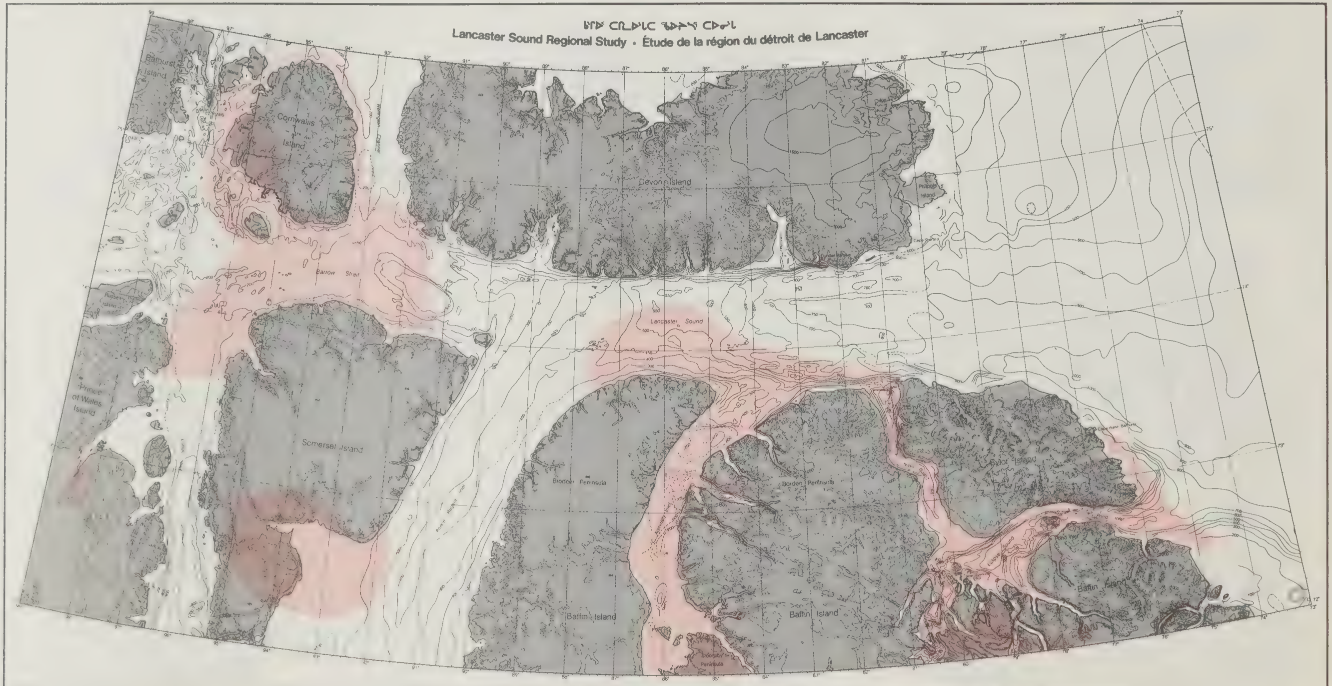


Hunting and Fishing Patterns: Summer • ᐊᖑᓇᓱᒃᓂᕆᔭᐅᕙᒃᑐᑦ ᐊᒻᒪ ᐃᖃᓗᒐᓱᒃ ᓂᕆᔭᐅᕙᒃᑐᑦ ᒪᓂᒃᐸᒃᑕᕐᒥᑦ: ᐊᐅᔭᖅ • Chasse et pêche: été 1974-1982

Red colour indicates areas where Inuit commonly hunt or fish in summer. Key species harvested are shown in Figure 17.

ᐊᐅᐸᖅᑐᒥᒃ ᑎᑎᕐᓯᒪᔪᑦ ᖃᐅᔨᒋᐊᖅᕕᐅᑦ ᐃᓄᐃᑦ ᐊᖑᓇᓱᐊᖅᕕᒋᕙᒃ-ᑕᕐᒥᓂ ᐃᖃᓗᐊᖅᕕᒋᕙᒃᑕᕐᒥᓂᓗ ᐊᐅᔮᒍᑦ. ᐆᒪᔪᑦ ᐊᖑᓇᓱᒃᑕᐅᓂᖅᐸᐅᕙᒃᑐᑦ ᓇᓗᓇᐃᖅᓯᒪᔪᑦ 17,ᒥ.

Les zones en rouge sont celles où les Inuit vont couramment à la chasse et à la pêche. Les espèces principales chassées sont indiquées dans la figure 17.



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Kilometres — Kilomètres
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Atlas–donnees 1982

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Hunting and Fishing Patterns: Summer • ᐊᖑᓇᓱᒃᓂᑎᓗᔭᐅᕙᒃᑐᑦ ᐊᒻᒪ ᐃᖃᓗᒐᓱᒃ ᓂᑎᓗᔭᐅᕙᒃᑐᑦ ᒪᓕᒃᐸᒃᑕᕐᒥᑦ: ᐊᐅᔭᖅ• Chasse et pêche: été 1974-1982

Selected Components • ᐆᒃᑐᖅ ᖁᐅᑕᐅᔪᒪᓯᒪᔪ • Composantes choisies

1 Seal Hunting · ᓇᑦᑎᖅᓯᐅᖅᑏᑦ · Chasse au phoque

2 Whale Hunting · ᕿᓚᓗᒐᖅᓯᐅᖅᑏᑦ · Chasse à la baleine

3 Caribou Hunting · ᑐᒃᑐᓯᐅᖅᑏᑦ · Chasse au caribou

4 Fishing · ᐃᖃᓗᖕᓂᐊᖅᑏᑦ · Pêche

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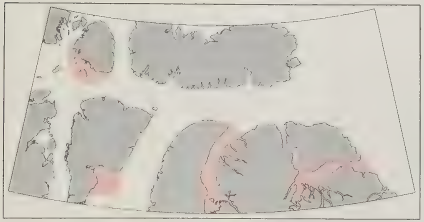

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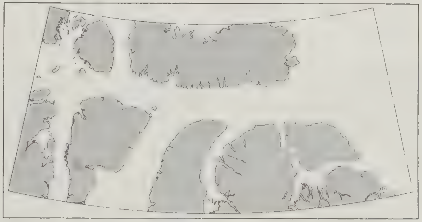

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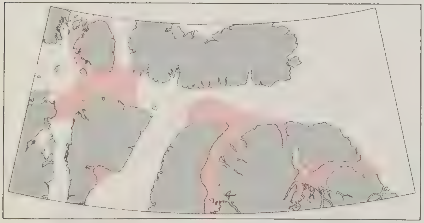

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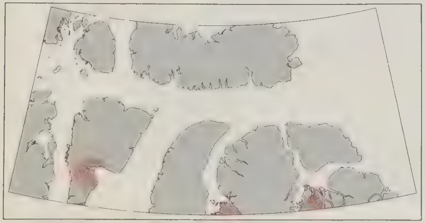

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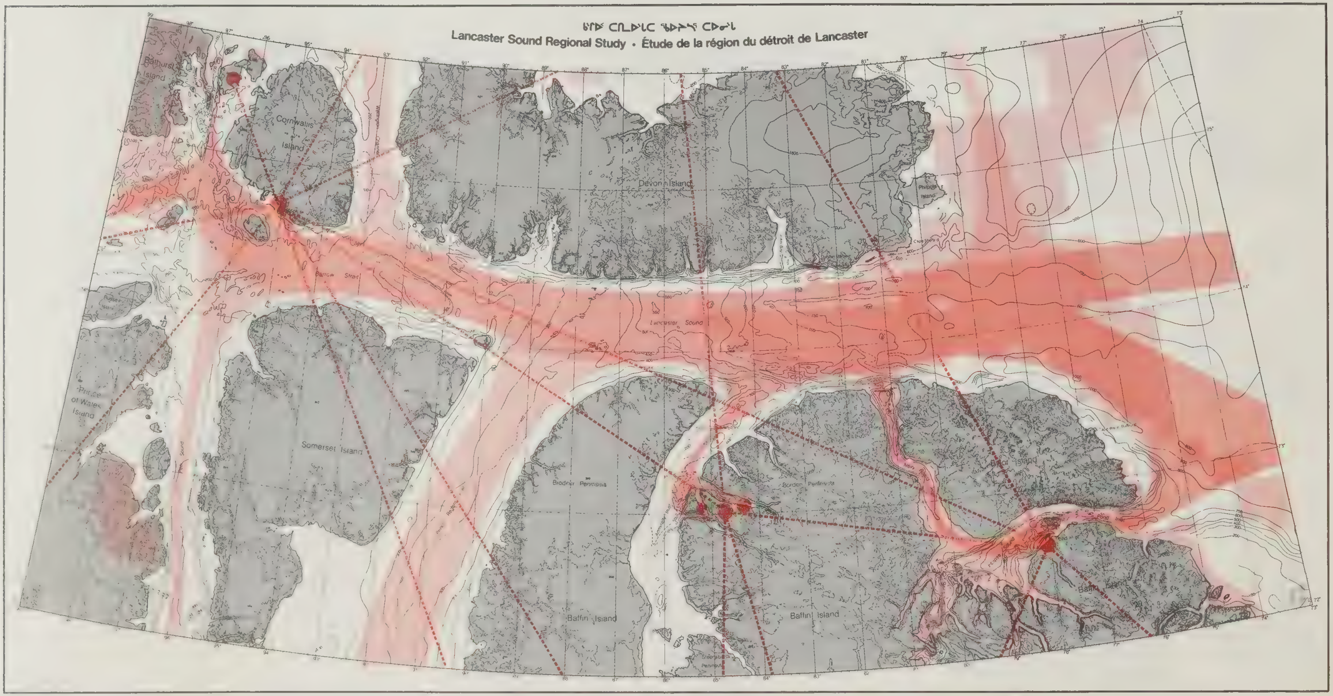
Current Commercial Activities: Summer • ᒫᓐᓇᐅᔪᖅ ᕿᓇᐅᑦᔭᒃᓯᕈᑕᐅᓇᓱᐊᖅᑐᑦ: ᐊᐅᔭᖅ • Activités commerciales actuelles: été

Commercial activities include shipping of lead-zinc ore, resupply shipping, scientific surveys, tourism, and air transport. Dark red indicates spatial coincidence of activities.

ᐊᔭᕐᕋᓂᐊᕐᕕᐅᕙᑦ, ᐅᓯᒃᑕᕐᕕᐅᕙᓗᓂᓗ, ᓂᐅᕐᕈᑕᕐᑐᓕᕐᑎᓚᕕᐅᓗᓂᓗ ᖃᒻᒪᑕᓱᑦ. ᐊᐅᐸᕐᓂᕐᓴᐃᑦ ᖃᐅᔨᒋᐊᕐᕕᐅᔪᓐᓂᕐᑐᑦ ᐱᓕᕐᑎᓚᕐᕕᐅᔪᓂᒃ.

Les activités commerciales comprennent le transport maritime des minérais de plomb et de zinc et des reapprovisionnements, les études scientifiques, le tourisme et le transport aérien. Les zones en rouge foncé indiquent la coïncidence d'activités au même endroit.



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Atlas—données 1982

18

Current Commercial Activities: Summer • ᒫᓐᓇᐅᔪᖅ ᑮᓇᐅᑦᔭᒃᓴᕈᑕᐅᓇᓯᐊᖅᑐᑦ: ᐊᐅᔭᖅ • Activités commerciales actuelles: été

Selected Components • ᐆᒃᑐᖅ ᖃᐅᑕᐅᔭᒪᓯᒪᔭ • Composantes choisies

1 Mining · ᐅᔭᕋᒃᑕᖅᓂᐊᖅᕕᑦ · Mines

2 Shipping: Corridors · ᐊᒃᔭᖅᑐᖅᕕᐅᓯᑦ ᐅᒥᐊᖅᔪᐊᒃᑯᑦ: ᐊᖅᑯᑎᒥᑦ · Transport maritime: corridors

3 Air Transport · ᖃᒃᒥᑕᓯᑦ ᐊᖅᑯᑎᒃᒥᑦ · Transport aérien

4 Tourism · ᐱᒃᑐᐊᖅᕖᑦ ᐊᓯᕙᒃᑐᐊᖅᕖᑦᑐ ᓂᐅᕈᔪᑦ . Tourisme

5 Oil and Gas: Permits · ᐅᖅᓱᐊᓗᖕᓂᐊᕈᓐᓇᐅᑎᖅᑳᐱᐅᔪᑦ · Pétrole et gaz: permis

6 Communities · ᓄᓇᓕᑦ · Communautés

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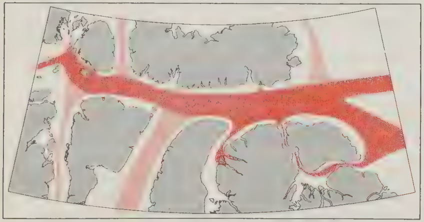

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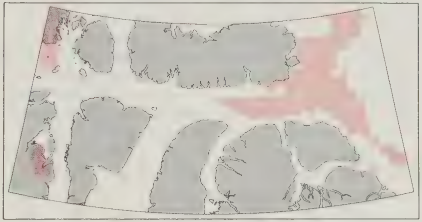

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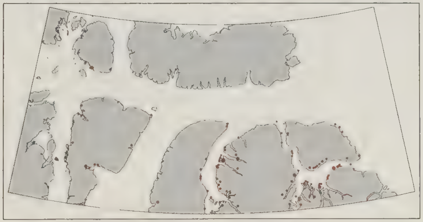

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munities and residents, generating jobs related to accommodation, meals, and guiding services.

Oil and gas exploration began in the Arctic Islands in 1960 when oil and gas permits covering most of the archipelago were issued. Initial drilling on Cornwallis Island took place in 1962, and on other islands in the study area during the 1970s. No exploratory drilling is under way at present.

Socio-economic Characteristics

Communities
During the past two decades, the attractions of schools, housing, and medical services have induced many Inuit to abandon camp life and move into communities. Today, there are three organized communities within the Lancaster Sound region: Arctic Bay (population 380), Pond Inlet (population 660), and Resolute (population 150). Arctic Bay and Pond Inlet are hunting communities with predominantly Inuit populations. Both began to develop as trading centres in the 1920s.

The settlement of Resolute was established by the federal government in 1953 with an immigrant population of Inuit from Pond Inlet and Port Harrison (now Inoucdjouac), northern Quebec. The settlement is 8 km from a non-native area, locally referred to as "the base," which has grown up around the airport, the transportation hub of the high Arctic. Because of its location, Resolute has usually offered more opportunities for wage employment, but hunting is still an important activity.

The politically unorganized community of Nanisivik (population 360), a mining community located on Strathcona Sound, 27 km from Arctic Bay, developed in the mid-1970s because of the lead-zinc deposit there; its population is predominantly non-native.

North of the study area is the small settlement of Grise Fiord (population 85). Like Resolute, it was established by the federal government in 1953 with an immigrant Inuit population from Port Harrison and Pond Inlet. Although they live outside the study area, residents of Grise Fiord hunt within the region on northern Devon Island. Accordingly, some reference is made to Grise Fiord in the following sections.

Local Political Structures
Each of the three organized communities in the region has a local political structure.

Organized as a settlement, Resolute is unincorporated but annually elects a council, which is, in a strict sense, an advisory body. In practice, however, the settlement council does exert significant influence over decisions taken by the federal and territorial governments on matters affecting the community. Grise Fiord is also a settlement.

Pond Inlet and Arctic Bay are incorporated as hamlets. A hamlet council has limited authority and may pass by-laws to regulate certain activities within the hamlet's boundaries. This includes responsibility for municipal services, road maintenance, zoning, and community planning. These essential services are mainly financed by operating contributions from the government of the Northwest Territories. Less than 10 per cent of their operating budgets is raised directly by the hamlets of Arctic Bay and Pond Inlet through licensing of businesses, rental of equipment and the sale of services, including water delivery and garbage and sewage removal.

The communities of the region have often identified social services, education and management of lands outside their boundaries as areas of critical importance to them. However, these programs are not generally under direct local control.

As mentioned, the senior levels of government generally consult with settlements and hamlets on matters that affect and concern them. The communities recognize, however, that consultation and control are not synonymous, and view the many proposals for development in the region with considerable concern. They are anxious for more authority at the local and regional levels.

Population
For most of the last decade, the communities in the

region experienced a steady natural increase in population.

In the last few years, however, Arctic Bay, Resolute and Grise Fiord have experienced some decrease in population. For Resolute and Grise Fiord, the cause for this decrease may be found in the artificiality of the communities: many residents have returned to their former homes in Pond Inlet and northern Quebec. For Arctic Bay, the decline may be attributed to the out-migration of some who had moved in to take advantage of employment opportunities when Nanisivik was under construction. In addition, some families from Arctic Bay have moved to Nanisivik.

Of the native communities, Pond Inlet alone has experienced steady growth. Nanisivik, where the non-native population forms a substantial majority, has increased considerably in population since 1976.

Assuming that the population decreases of the last few years were in response to specific short-term factors, and that average population growth rates of the last decade will continue, the Inuit population in the region should increase substantially over the next 20 years. Younger age-groups predominate in the Inuit population and thus natural increase will be a major factor in population growth.

Harvesting Wildlife

Most male Inuit consider themselves hunters on either a full- or part-time basis. Currently, permanent employment is available to 35-40 per cent of the male labour force; the rest depends on a combination of casual or seasonal employment and hunting. Even for those permanently employed, part-time hunting remains a means of supplementing their food supplies. Within extended family groups, there is substantial sharing of cash resources from wage employment and of food resources from the hunt.

During 1978-79, hunting and trapping generated an estimated total cash income of $302 400 from fur, sealskin, and ivory sales, as determined from the returns of general hunting licences, the holders of which were Inuit. Over a five-year period, edible meat available averaged 190 400 kg (420 300 lbs) per year, with an imputed annual value of $1.2 million. These figures include those for Grise Fiord. Note that general hunting licence returns are thought to seriously under-report the game harvest and the value of country resources produced.

The harvest area is larger in winter when sea ice forms a generally stable avenue of access to distant hunting territories from communities and permanent camps. In late spring and summer, generally before breakup, people from the communities disperse to traditional camps in favourable hunting areas. Families remain at their campgrounds through breakup and most of the summer, returning to the communities usually in late August or September. During the ice-free period when transportation is by boat, the population is dispersed over a wide area, but individual hunting ranges are not nearly as extensive as in winter and spring.

Hunting activities may be hindered by transportation difficulties especially during freeze-up and breakup and by the winter darkness prevailing in December and January. Also, hunters must abide by laws establishing harvesting seasons and quotas, and many spend part of their time in wage employment when it is available. Cash is necessary to buy supplies, especially fuel for snowmobiles. In addition, hunting may be restricted by the biological characteristics of certain prey species, for example, by irregular movement patterns.

Northwest Territories government game returns and Department of Fisheries and Oceans data for 1978-79 indicate that 1 714 ringed seal, 1 309 arctic fox, 1 124 caribou, 241 narwhal, 123 polar bear, 32 walrus and 17 white whale (beluga) are known to have been harvested by Inuit in the Lancaster Sound region. Although these figures are considered incomplete because of the failure of some hunters to report their wildlife take, and other statistical problems, they provide some indication of the size of the wildlife harvest in the region.

Modern technological innovations, especially the snowmobile, have had a dramatic effect on hunting as

a means of livelihood. In particular, it is the extensive use of snowmobiles during the ice-covered period of the year that has drastically disrupted the tenuous balance that formerly existed between Inuit and their prey. The snowmobile has greatly increased the extent of the winter hunting range but decreased the duration of hunting trips. Unlike the hunt by dog team, in which one product of the hunt fueled the means of transport, the hunt by snowmobile requires that the cash proceeds from the sale of skins are used to purchase fuel for the vehicle or to pay for the vehicle itself. High fuel and equipment prices, therefore, lead to increased harvests, and serious wastage of meat occurs.

In purely cash terms, hunting by snowmobile is uneconomical, and casual or seasonal wage employment, for those who are primarily hunters, subsidizes the increased cost of hunting by this means. But the hunt continues to provide large quantities of "country food" at costs estimated to be much less than those for comparable imported foodstuffs available in local retail outlets.

The hunt has, moreover, an important value other than economic - Inuit *prefer* country food to food sold in local stores. Estimates of country food available from harvested animals in each community have generally neglected cultural preferences for certain foods. At best, such estimates indicate availability of food resources, not their consumption. Attempts to impute a cash value for country food face similar problems, for it has proven difficult to describe, in monetary terms, the nutritional and cultural importance of the consumption of locally harvested game. These cultural preferences, rather than solely economic criteria, have kept hunting a prestigious activity.

In recent years, the government of the Northwest Territories has initiated an Outpost Camp Program to financially assist families wishing to adopt or continue a hunting lifestyle on the land. In 1980, there were four assisted permanent camps in operation in or adjacent to the region, involving a total of 35 people. The program has been judged a success by the territorial government and has attracted considerable interest from community residents. It may well continue and expand.

Wage Employment

Until the 1970s, wage employment opportunities were severely limited. At Pond Inlet and Arctic Bay they consisted mainly of the provision of labour for the local trader and for government. At Resolute, opportunities were greater, primarily in labour positions at the base. At all locations, minimal opportunities existed for employment of women, usually as housekeepers.

In 1972, Panarctic began to hire Inuit men from Arctic Bay and Pond Inlet to work as well-paid, though unskilled, labourers at exploration sites in the high Arctic Islands. This program is still in operation. In 1974, men from Arctic Bay and other locations found additional employment in construction at Nanisivik.

The effects of industrial employment and high wages included increased consumption of material goods and a generally higher standard of living, coupled with higher expectations that often could not be maintained. Because much of the employment was away from the communities, family stability in some cases became threatened. For others, increased cash also brought a higher consumption of alcohol. The availability of permanent employment at Nanisivik has had a detrimental effect on community leadership in Arctic Bay: at one point five families moved to the mine site from Arctic Bay, four of them headed by long-term members of Arctic Bay's council.

In the organized communities, employment opportunities include positions such as municipal service workers, clerks, mechanics, teaching assistants, and administrators. Other opportunities exist further afield in the form of support jobs for oil and gas exploration and mining development projects. Some permanent employment is also available when these projects are operational.

More opportunities are available for skilled labour, but few Inuit from the region enter the high school in Frobisher Bay and fewer still graduate. In the local schools, education is available to the grade eight or nine level. Many Inuit have not recognized the value of

a sound education in a decade that has provided many well-paid job opportunities for unskilled labour, and parental support for higher education is often lacking. In addition, the educational system is generally considered by Inuit to be a "southern" system, largely unresponsive to Inuit needs.

Income
Levels of income in the region, in cash or kind, have been relatively high. Employment in non-renewable resource development and exploration offers wages considerably higher than those for jobs in the communities. Wage employment and hunting generate cash incomes, and hunting, as mentioned, also provides a potentially large supply of country food. Many incomes are supplemented by the production and sale of art objects and handicrafts, notably soapstone and whalebone carvings. Women, as well as men, earn money in this manner.

In Pond Inlet, tourism has become an important industry. The local co-operative operates a hotel in the community and a summer fishing camp at Koluktoo Bay that provide job opportunities for many residents. Tourism is as yet undeveloped in the rest of the region. In Pond Inlet and Resolute, local co-operatives also operate retail stores. In each community, one or two entrepreneurs operate small businesses, including coffee shops, billiard rooms, taxi and freight haulage services, and small retail stores.

Government transfer payments, especially family allowance benefits, are an important supplement to most family incomes. Social assistance payments in the region are not generally high, but levels fluctuate considerably.

The Northwest Territories Housing Corporation provides rental homes in all communities. Monthly rental charges, which include all municipal services, electricity, and fuel oil, are heavily subsidized by government and this contributes to the generally high standards of living. Food and transportation costs in the region are not subsidized, however, and are high.

Residents' Perceptions
Residents of the communities in the region are increasingly aware of the magnitude of the proposals for development and how such development may directly affect them and their lifestyles. Most feel that development will occur and some support it, but all insist that development projects should not proceed without guarantees of real benefits to the region's residents.

Desired benefits from industrial projects are seen by residents to include business opportunities, training, jobs, control over working and operating conditions, and receipt of royalties. Their concern about proposals for the protection of natural areas and the region's biological productivity is that no additional restrictions be placed on their hunting activities. The settlement of land claims is also a high priority. It is becoming increasingly common in the region to hear the comment: "We do not oppose non-renewable resource development, but we are against projects being started before the land claims are settled."

Appendix B
Lancaster Sound: Potential and Future Uses

In this appendix activities that could take place in certain parts of the Lancaster Sound region during the next 20 years are examined. Those major industrial ventures already being actively pursued (mining) and those proposed for possible implementation in the near future, (year-round shipping, hydrocarbon exploration and development) are outlined first. Further detail on some proposed industrial activities is provided in Appendix C. Also dealt with are such uses proposed for the region as the establishment of national parks and other types of conservation areas. Finally, the future of those activities more closely related to the present lifestyle of the Inuit residents, such as the development of community-based tourism and the harvesting of fish and wildlife, is looked at.

Each of these activities and the benefits that the proposed industrial ventures would bring for the local residents and the Canadian economy as a whole should be considered, keeping in mind the social and environmental implications for the region. While some changes and associated effects appear inevitable, others may or may not be acceptable.

In addition to considering each proposed activity separately, it is also necessary to examine the interactions among various activities, and the cumulative effects that may result from the joint implementation of several activities. To facilitate this review, a composite map (Figure 20) has been compiled to show the spatial relationships of the various potential activities.

Most of these activities would occupy restricted locations within the region and would take place in the summer seasons. The darker areas on the map highlight zones where activities might occur simultaneously. From the composite map, it can be seen that the eastern end of the Lancaster Sound region shows the greatest concentration of potential activities. This sharing of space could be beneficial for the activities concerned if, for example, it would permit joint use of facilities. In other cases, spatial overlapping of activities may be detrimental to one or more of the pursuits.

The major features of each activity, together with a brief assessment of its likely economic, social, and environmental implications, are described on the following pages. From this review, some major considerations emerge that must be addressed with regard to the future use and management of the region.

In preparing these activity descriptions, it has been assumed that all future development activities will be subject to existing regulatory controls to minimize environmental and social impacts. The implications of a land claims settlement have not been examined. It may be assumed that the settlement of land claims currently being negotiated would have a significant effect on the social and economic circumstances in the Lancaster Sound region (see Chapter IV); however, it is not possible to anticipate specific outcomes at this time.

A great deal of what might be described as "socio-economic impact" is government induced, through policies on native employment, local business opportunities, and the like. These policies are a direct response to requests from northern communities that northerners obtain benefits from resource development.

Shipping

Any non-renewable resource development in the Arctic will depend on safe and reliable shipping. Today, shipping occurs during the two-month ice-free period only, for resupply operations, ore shipments, marine surveys, and icebreaker support operations.

These uses are expected to continue over the next 20 years with an additional modest growth or a trend to larger carriers to meet the demands of a growing population for fuel, accommodation, and vehicles. Ore shipment from Nanisivik will decline during this period, but because of the new Arvik mine on Little Cornwallis Island, total ore shipment through Lancaster Sound will increase. Summer shipping corridors will not change appreciably.

An important change from the established pattern of summer shipping to year-round shipping would occur with the use of large ice-breaking tankers carrying cargoes of crude oil or liquefied natural gas (LNG). Although such tankers have not yet been constructed, legislative authority exists for the construction, opera-

Potential Activities • ᐱᕙᓐᓇᖃᔭᕐ ᔫᐊᖅᓂᑦ • Activités possibles

Shipping Corridor • ᐅᒥᐊᖅᑲᐊᑦ ᐊᖅᑯᑎᒋᑦ • Corridor de navigation

Favourable Geology and/or Limited Mineral Resources • ᓴᕕᖃᔅᓴᖃᓯᒋᔭᐅᔪᑦ ᓴᕕᖃᔅᓴᖃᑐᓂᑦ ᐊᒡᒋᓗᐊᒋᑐᒥᑦ • Géologie favorable ou ressources minérales limitées

Near-term Producer (1982): Arvik (Polaris Deposit) • ᐅᔭᖃᑦᑕᖅᓂᐊᕐᕕᐅᔪᒫᖅᑐᖅ (1982): ᐊᕐᕕᒃ (ᐅᔾᔨᓗᐊᖅ ᐊᖅᑭ) • Mine productive à court terme (1982): Arvik (gisement Polaris)

Potential Producer: Arvik (Eclipse Deposit) • ᐅᔭᖃᑦᑕᖅᓂᐊᕐᕕᐅᑐᐃᓐᓇᕆᐊᓕᒃ: ᐊᕐᕕᒃ (ᑕᓂᓯᒪᔪᖅ) • Producteur éventuel: Arvik (gisement Eclipse)

Proposed Drilling Sites • ᐃᑯᑦᑕᖅᕕᐅᔪᒫᑦ • Lieux de forage proposés

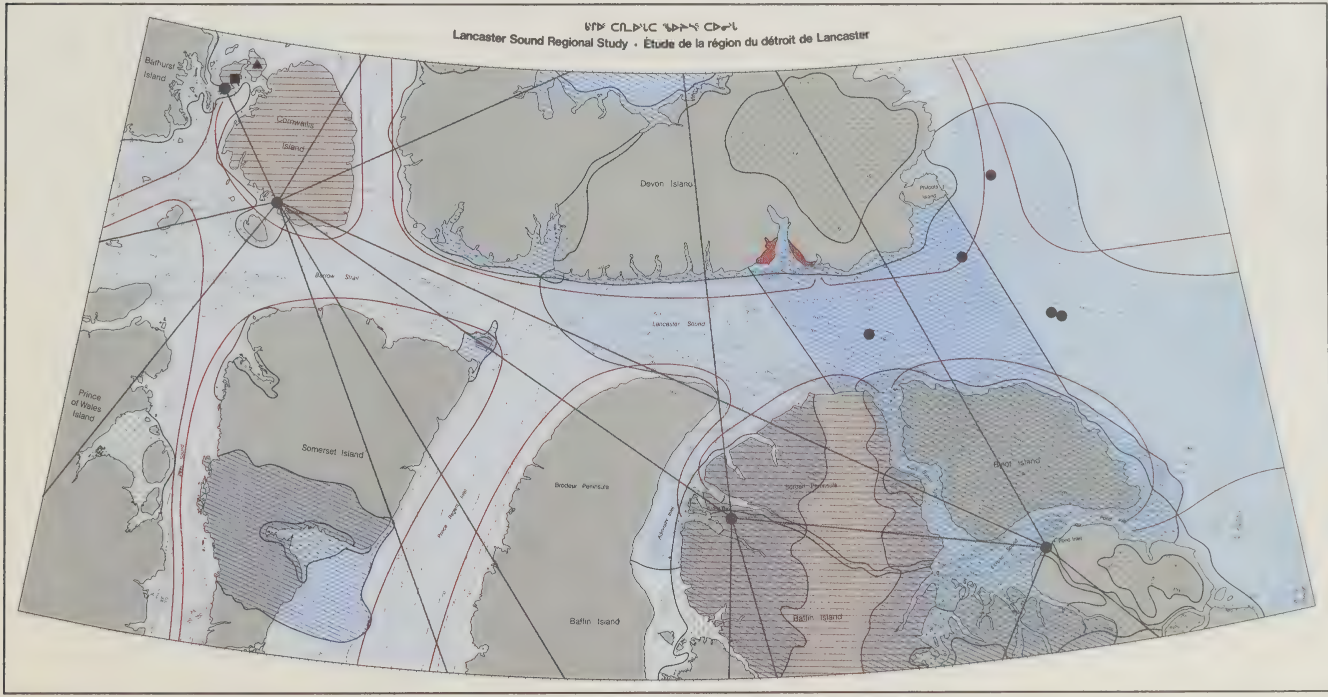
Land-based Facilities • ᓄᓇᒥ ᓴᓇᕝᕕᐃᑦ • Installations terrestres

Potential Extent of Accidental Oil Pollution • ᐅᖅᓱᐊᓗᒻᒥᑦ ᓯᑐᔭᖅᓂᖅ ᓇᒥᓇᔅᓯᒪᓕᑦ (ᐊᒃᑭᖅᓯᑦ) • Etendue possible de pollution accidentelle

Air Routes • ᖃᖓᑕᓯᑦ ᐊᖅᑯᑎᒋᑦ • Routes aériennes

Parks Canada's Areas of Interest • ᑲᓇᑕᐅᑉ ᑲᔪᖅᓇᖅᑐᓂᕐᔪᐊᒥᑦ ᐱᕈᕐᒥᔭᕆᑦ • Régions d'intérêt de Parcs Canada

Tourism • ᐱᕈᐊᖅᕕᐅᓯᑦ ᐊᓯᐅᕈᐊᖅᕕᓗ ᓂᐅᕈᐊᓗᑦ • Tourisme



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Scale • 1:1 000,000 • Échelle
Kilometres / Kilomètres
Statute Miles / Milles terrestres
Nautical Miles / Milles marins
Contours in Metres • Lambert Conformal Conic Projection • Projection conique conforme de Lambert • Courbes de niveau en mètres

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Atlas–données 1982

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tion, and regulation of ice-breaking tankers designed to move through ice thicknesses of up to 3 m. The potential frequency of year-round shipping through the Sound over the next 20 years, based on representative data, ranges from one transit every second day to a maximum of three transits per day by the end of the period.

Summer and winter shipping corridors as well as potential ports and harbours in the region are shown in Figure 21. Some of the proposed hydrocarbon transportation projects are outlined in Appendix C.

Regulation of year-round shipping would require the institution of a mandatory vessel-traffic management system, reliable arctic radio communications, and a year-round means of surveillance. Although legislation for these matters exists, government would have to provide the necessary funding to establish these services.

Winter shipping would tend to be confined to a narrow east-west lane along the northern portion of the Sound so as to take advantage of the extensive floe-edge lead that is present in most years (see Figure 21). This winter shipping corridor would extend westward to the Beaufort Sea via the Northwest Passage (Prince of Wales Strait route). Strict control over the use of this corridor would be required to minimize damage to biologically or environmentally sensitive areas in Lancaster Sound and elsewhere within the Northwest Passage.

Implications

Canada could achieve its goal of energy self-sufficiency by reducing reliance on oil imports, by fostering the development of additional reserves in the Arctic, by finding the technologies required for further arctic developments, and by encouraging gas-for-oil substitution in eastern Canada. Shipping hydrocarbons through Lancaster Sound would be a part of the process.

Shipping activity involving the transport of minerals, hydrocarbons and other commodities would lead to the development of new technologies in the marine industries, thereby generating a significant number of jobs in various industries throughout the country. Canadian advances in marine technology could make Canada a world leader in this field.

Employment in the region could also be increased by training Inuit to serve as crew members on Canadian vessels operating in the Arctic. The operation of port facilities and other support services would open the way for employment, business, and training opportunities. Higher revenues and income in the communities of the Lancaster Sound region would result. As well, more frequent shipping and improved facilities may lower transportation costs of essential goods for the communities, such as fuels, foodstuffs, and housing materials.

Year-round shipping could, however, have environmental effects. Ship tracks through consolidated ice cover refreeze at varying rates during the year and not at all in the spring. Slow-freezing or unfrozen ship tracks could therefore interfere with inter-island crossings by caribou, arctic fox, and Inuit hunters. Whales could become entrapped in the refreezing ship tracks, and ringed seals disturbed and, in some cases, destroyed during the breeding and pupping seasons in east Barrow Strait. Migrations of some sea mammals and birds that normally move through or concentrate in Lancaster Sound could be disrupted - particularly if the shipping route were to follow the biologically important floe-edge in the east-west lane along the northern portion of the Sound, as proposed.

World-wide experience with risks inherent in tanker transport suggests that the projected level of shipping over the 20-year period could be expected to result in at least one major oil spill and possibly one LNG-fire, attributable to tanker accidents, somewhere in the Northwest Passage. The extent of oil spill damages would depend on the location of the accident, the amount of oil released, the season, the dispersion by wind and currents, the clean-up response time, and the capabilities of the clean-up equipment used.

Oil spills in winter would be initially restricted to the ship track, but residual oil would be distributed by winds and currents when ice cover broke and melted. A large oil spill in Lancaster Sound would be very serious biologically and would also have serious economic repercussions in the communities.

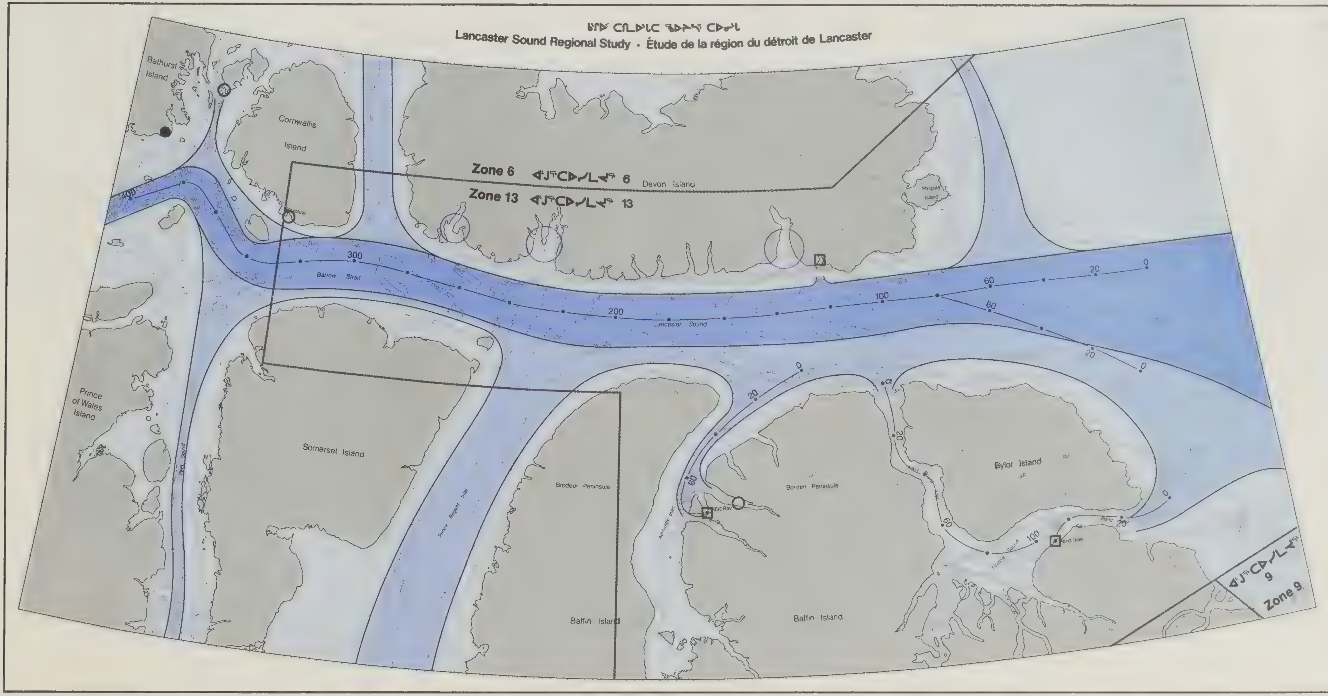
Shipping: Potential Corridors • ᐃᓱᒋᕋᕕᐅᔪᓐᓇᖅᑐᑦ ᐅᒥᐊᕐᔪᐊᒃᑯᑦ: ᐊᖁᑎᖏᑦ ᐊᑐᖅᑕᐅᔪᓐᓇᖅᑐᑦ • Transport maritime: corridors possibles

- Shipping Corridor (Summer) • ᐅᒥᐊᕐᔪᐊᕐᓄᑦ ᐊᖁᑎᒋᔭᐅᔪᓐᓇᖅᑐᖅ (ᐊᐅᔭᒃᑯᑦ) • Corridor de navigation (été)
- Shipping Corridor (Winter) • ᐅᒥᐊᕐᔪᐊᕐᓄᑦ ᐊᖁᑎᒋᔭᐅᔪᓐᓇᖅᑐᖅ (ᐅᑭᐅᒃᑯᑦ) • Corridor de navigation (hiver)
- Shipping Safety Control Zone Boundary • ᐅᒥᐊᕐᔪᐊᓄᑦ ᐅᐸᒃᑕᐅᔪᓐᓇᖅᑐᑦ ᐃᓯᐊ • Limite de la zone de contrôle de la sécurité de la navigation
- Distance (nautical miles) • ᐅᖓᓯᓐᓂᖏᑦ (ᐅᒥᐊᕐᔪᐊᓯᐅᑎᑦ ᒪᐃᓪ) • Distance (milles nautiques)
- Harbours • ᑭᓴᕝᕕᐅᔪᓐᓇᖅᑐᑦ • Ports de mer
- Ports • ᑐᓚᒃᑕᕝᕕᑦ • Ports
- Proposed Racon Beacon • ᓇᓗᓇᐃᖅᑕᕈᑎᓕᐅᕐᕕᐅᔪᓐᓇᖅᑐᑦ • Balise
- Potential Ports • ᑐᓚᒃᑕᕝᕕᐅᔪᓐᓇᖅᑐᑦ • Ports éventuels

Note: A harbour is a place which provides good anchorage for the purposes of temporary shelter or for the loading and unloading of cargoes. A port is a place for the loading or unloading of ships that is supervised by public or private authorities.

ᐅᖃᐅᓯᕐᓈᖅ: ᐃᐱᐊᕐᔪᔪᖅ ᑭᓴᕝᕕᒃ ᑭᓴᕝᕕᑦᑎᐊᕙᐅᔪᖅ ᐊᓄᕆᒦᓐᓇᓗᐊᕐᒥᓗᓂ ᐊᒻᒪᓗ ᐅᓯᓕᖅᑐᖅ ᕕᐅᕙᓗᓂ ᓂᐅᕋᐃ ᕕᐅᕙᓗᓂᓗ ᐅᒥᐊᒃᑯᑦ ᐊᔭᖅᑕᐅᓂᐊᖅᑐᓂ ᓂᐅᕋᐃᕝ ᐅᓯᓕᖅᑐᕝᕕᐅᕙᓗᓂ ᐊᒻᒪᓗ ᓂᐅᕋᐃᕝᕕᐅᕙᓗᓂ ᐅᒥᐊᕐᔪᐊᓂ ᑲᒪᒋᔭᐅ ᓗᓂ ᑭᒡᒍᑎᓇᓄᑦ ᐅᕙᓘᓂᑦ ᓈᒻᒥᓂᖅᑐᓂ ᑲᒪᔨᓂ

Un port de mer est un havre naturel et un endroit de mouillage pour fin d'embarquement ou de débarquement du matériel. Un port (aménagé) est un endroit d'embarquement ou de débarquement des navires sous la surveillance d'une autorité privée ou publique.



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Scale • 1:1 000 000 • Échelle
Kilometres • Kilomètres
Statute Miles • Milles terrestres
Nautical Miles • Milles marins
Contours in Metres • Lambert Conformal Conic Projection • Projection conique conforme de Lambert • Courbes de niveau en mètres

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References • Références
Data Atlas
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Atlas–données 1982

21

Although liquefied natural gas is not a pollutant, there is a slight possibility that an LNG tanker accident could result in an extensive plume of ignited natural gas. This could be lethal to colonies of birds or groups of mammals if the incident occurred close to them.

Effective monitoring, control, and support of year-round arctic shipping would result in increased costs to government. These costs would have to be met by the ship operators, the cargo owners, the taxpayers, or by some agreed combination of these as determined by government. The capabilities and limitations of available pollution clean-up equipment and the technology applicable to arctic clean-up operations are important considerations.

Oil and Gas Exploration

The rising costs of imported oil led to the federal government's 1976 "need-to-know" policy, which seeks to assess systematically the petroleum potential of the North. To the present, approximately 150 exploratory wells have been drilled in the Arctic Islands and the Davis Strait area.

Geologically, the areas under the waters of Lancaster Sound and Baffin Bay offer the best prospects in the region for future exploration: nearly 30 potential hydrocarbon-bearing structures have been identified. Up to 50 wildcat exploratory wells (to demonstrate the presence or absence of oil and gas) and delineation wells (to estimate the reserve and size of the structure) could be drilled offshore for extensive exploration of these structures. Some of the activities associated with potential oil and gas exploration in Lancaster Sound are shown in Figure 22 (also refer to Appendix C).

Exploratory drilling in Lancaster Sound would require commitment of two drillships operating each year during the open-water season. Four to twelve supply ships would be needed for resupply, fuel transfer, ice reconnaissance, and towing of icebergs. Shore-based and port facilities, possibly located on southeastern Devon Island so as to be close to the offshore drilling operations, would occupy about 20 ha and comprise a dock area, a bulk storage area, an airstrip, and roads. Support aircraft would be used intensively during drilling operations.

Increased aircraft traffic would be expected in the vicinity of Pond Inlet and Nanisivik, and over southern Devon Island, Bylot Island, Navy Board Inlet, and Eclipse Sound. Crew transfers and re-supply between shore-based facilities and offshore drillships could involve two helicopters making two to four trips per day, and a Twin Otter making three to four trips per week from a logistic centre such as Pond Inlet or Nanisivik. Vessel traffic between drillships and shore-based facilities would be light to moderate, involving perhaps four to five trips per week. Ice breaking of landfast ice would be required in Croker Bay or Dundas Harbour during July and early August if a shorebase were located there.

Implications

Benefits associated with hydrocarbon exploration in the region would include fulfilment of the "need-to-know" policy about northern energy resources, thereby aiding national energy decision-making. It should be noted, however, that in May 1981, a spokesman for the federal Department of Energy, Mines and Resources stated that, as regards Lancaster Sound, the department would like to know the potential for oil and gas development, but does not need to know immediately.[1] Such exploration could result in the finding of significant new reserves that would be within easier reach of markets than those of the Melville Island or Beaufort Sea areas and, particularly, much closer to the import-dependent East Coast market.

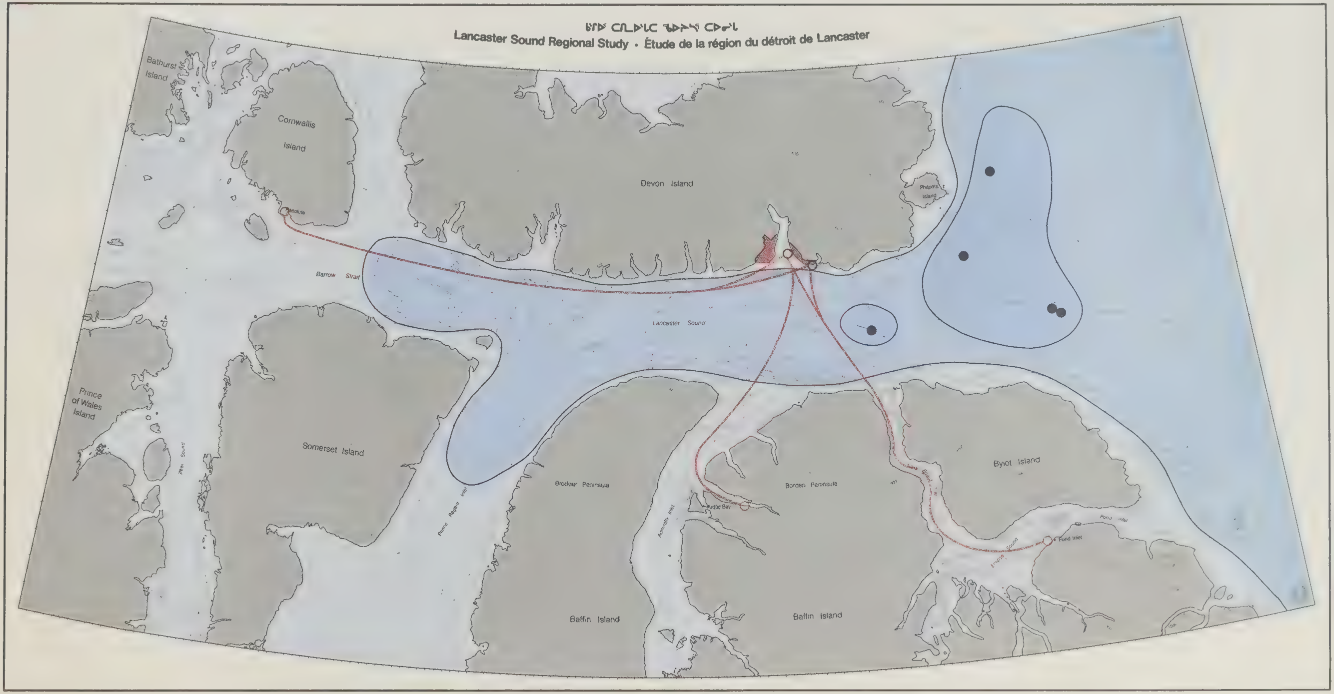
Additional seasonal employment opportunities for skilled and non-skilled workers would be available to residents of Pond Inlet, Arctic Bay, and Resolute. Residents have expressed a need for the early identification of specific employment opportunities, and the provision of education programs to allow them to learn the skills necessary to fill jobs as they become available. Other indirect large job opportunities would also

[1]J.P. Hea. Submission on Behalf of the Department of Energy, Mines and Resources. Lancaster Sound Regional Study Workshop, Ottawa, May 1981; 4 p. (LSRS Open File No. S-05).

Oil and Gas: Exploration · ᐅᕐᓱᐊᓘᓐᓂᐊᕐᕕᑦ ᒫᓯᒃᓴᕐᓂᐊᕐᕕᖓ · Pétrole et gaz: exploration

- Airports and Crew Rotation Sites • ᓴᓇᔭᓐ ᓂᑉᑖᕐᐱᐅᕐᑦᑕᓪᓚᕙᑦ • Aéroports et lieux de roulement des équipes de travail
- Re-supply Barges • ᐊᔾᔨᕐᑐᐃᕙᑖᕐᑦᑕᓪᓚᕙᑦ ᓱᑲᐳᔾ • Barges d'approvisionnement
- Re-supply Routes • ᐊᔾᔨᕐᑐᐃᕝᑖᕐᑐᑦ ᐊᕐᖁᑎᑦ • Routes d'approvisionnement
- Proposed Drilling Sites • ᐃᑰᑖᕐᐱᐅᕙᓪᓚᕙᑦ • Lieux de forage proposés
- Land-based Facilities • ᓄᓇᒥ ᓴᓇᕐᐱᑦᑖᕐᐱᐅᕙᓐᓂᑦ • Installations terrestres
- High Potential Exploration Areas • ᕐᑲᐅᔭᕐᓇᕐᖁᒥᔭᐅᕙᑦ • Zones à potentiel exploratoire élevé
- Low/Moderate Potential Exploration Areas • ᕐᑲᐅᔭᕐᓇᕐᖁᒥᓇᓚᓪᓗᑐᑦ • Zones à potentiel exploratoire faible à modéré

Map represents a five-year projection • ᑖᓐᓇ ᓄᓇᓐᖁᐊᕐ ᑕᓂᒪᓃ ᐅᑭᐅᓃ ᓇᓗᓐᑖᑐᑕᐅᕙᕐ • La carte représente une prévision de cinq ans



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Scale • 1:1,000,000 • Échelle
Kilometres / Kilomètres
Statute Miles / Milles terrestres
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Atlas – données 1982

be created in other parts of the country through these exploration activities. Regional benefits would include local business opportunities as well as job opportunities on supply ships and barges, and at land bases such as Pond Inlet, Nanisivik or Resolute. Local economic benefits are important because of a growing northern labour force.

Larger airports, new port facilities, and increased air and ship traffic for resupply may result in cheaper freight rates from southern Canada and in greater mobility for residents in the region. In addition, increased private investment within the communities could provide a wider range of services and facilities available for the residents.

Oil and gas exploration in Lancaster Sound would, however, also bring with it potentially detrimental environmental effects.

The impact of the construction and operation of shore bases and dock facilities, and particularly the movement of supply boats, on large numbers of migrating white whales and narwhals in Croker Bay and Dundas Harbour needs to be assessed carefully. Also, disturbance to migrating walruses along the Croker Bay ice edge in the month of July, and of harp seals and feeding polar bears from July to September, needs to be examined.

Increased human activities in narrow coastal areas would affect animal populations concentrated there. Animals such as whales and seals could be temporarily displaced, while walruses could be permanently displaced. Polar bears could remain in the area and become a source of physical danger to the workers. Local disturbances caused by shore facilities could affect large populations of eiders and guillemots that rest and rear broods in the surrounding coastal lowlands. In addition, increased aircraft movements between land-based facilities and drill sites could disturb wildlife and, in some cases, lead to habitat abandonment.

Noise and discharges from drilling operations could cause local disruption to migrating narwhals in eastern Lancaster Sound during May, June and September, and to feeding bowhead whales throughout the drilling season. This may not be a significant problem, however, as the drillships, support vessels, and aircraft would be localized offshore, and rapid dilution of operational drilling wastes would occur in the Sound's deep waters and strong currents.

An accidental oil spill from an uncontrolled sub-sea blowout would produce severe impacts, particularly in the coastal waters of southern Devon Island and of northern Bylot Island. These impacts would depend on the magnitude of the accident and on the season in which it occurred. Possible results could include the loss of large numbers of migrating birds in the offshore and nearshore waters of eastern Lancaster Sound and on the shores of northwestern Baffin Island, from May to October. Pollution in offshore and coastal waters could threaten thousands of ringed seals while pupping in the spring or moulting in early summer. Considerable numbers of feeding polar bears would also be threatened in the spring and late summer. A reduction or displacement of the marine mammal resources would cause hunting efforts to focus more on terrestrial wildlife populations, thus possibly leading to their overexploitation.

The Arctic Waters Pollution Prevention Act assigns financial liability for clean-up costs to exploration companies and provides legal recourse for compensation to anyone suffering loss or damage as a result of an oil spill. Clean-up of oil spills, however, may not always be possible because of the magnitude of the spill, the absence of effective technology, or interference by extreme environmental conditions of ice, wind, and cold. The principal disruption and inconvenience would be suffered by the residents of the region.

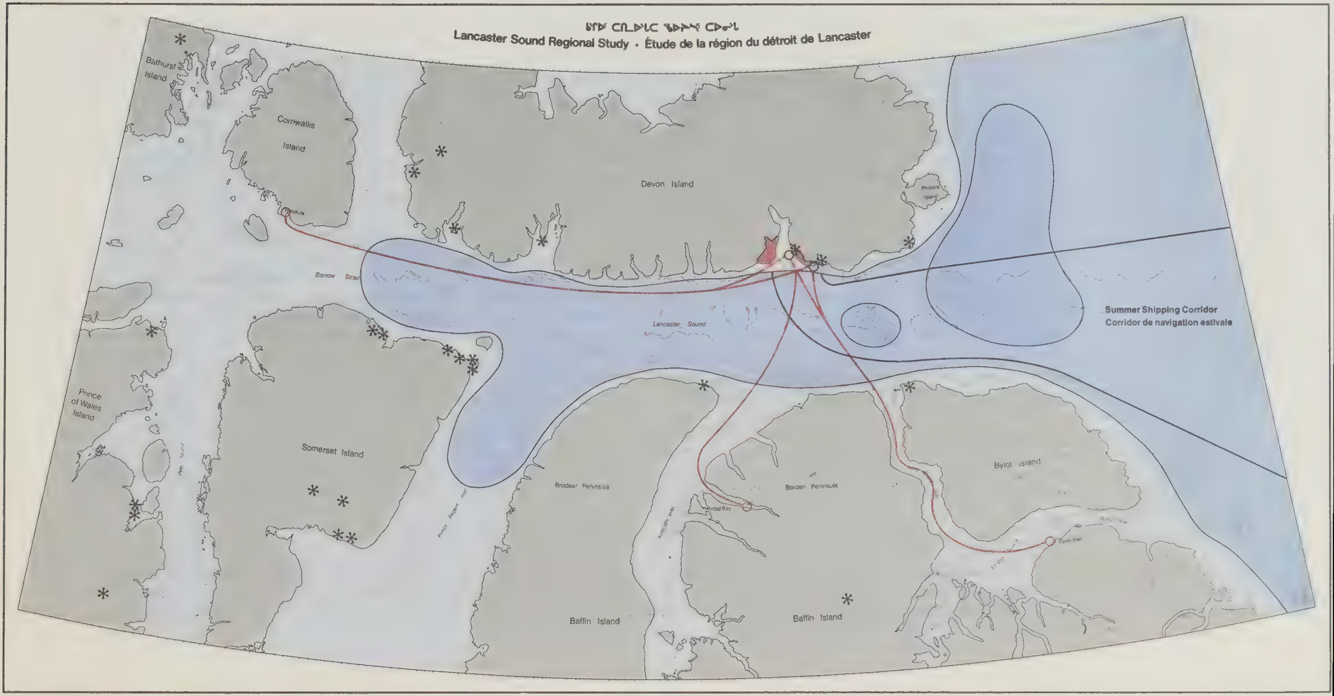
Oil and Gas Development and Production

At this time, there are no production systems in existence that could be employed to provide safe and reliable year-round operations in the event of the discovery of oil and gas fields in Lancaster Sound. Current technology precludes the development of fields in water depths greater than 350 metres. However, rapid technological progress in various parts of the world

Oil and Gas: Potential Development • ᐅᕐᓱᐊᓘᑦ ᒫᓃᒃᓴᓗᓐᓄ: ᐱᓇᓱᐊᕐᕕᐅᕙᓐᓂᖅᑐᑦ • Pétrole et gaz: développement possible

- ○ Airports and Crew Rotation Sites • ᖃᓂᒍᓐ ᓂᑉᑦᑖᕐᐱᐅᕐᑲᑦᑕᕈᓐᓂᖅᑐᑦ • Aéroports et lieux de roulement des équipes de travail
- ○ Marine Tanker Terminals • ᐅᕐᓱᐊᓘᑕᐅᑎᓐ ᑐᓛᑦᑕᕐᐱᐅᕙᓐᓂᖅᑐᑦ • Terminaux maritimes pour navires-citernes
- Re-supply Routes • ᐊᓯᖅᑐᐃᑲᑦᑕᖅᑐᑦ ᐊᕐᑯᑎᒋᒐᔭᕐᑕᕆᑦ • Routes d'approvisionnement
- Land-based Facilities • ᓄᓇᒥ ᖃᓂᕐᑯᑎᕐᑲᕐᐱᐅᕙᓐᓂᖅᑐᑦ • Installations terrestres
- * Staging Airstrips • ᐱᕆᐊᕐᕕᐅᕐᑲᑦᑕᕈᓐᓂᖅᑐᑦ ᒥᑦᑕᕐᕕᑦ • Principales pistes d'aviation d'étape
- High Potential Development Areas • ᕐᑲᐅᔮᖅᕐᕕᑯᒥᕆᔭᐅᕙᑦ • Zones à potentiel de développement élevé
- Low/Moderate Potential Development Areas • ᕐᑲᐅᔮᖅᕐᕕᑯᒥᓇᒪᓛᑦᑐᑦ • Zones à potentiel de développement faible à modéré

Note: Area operators have not submitted viable production systems for our consideration. • ᐅᑦᔮᑎᒐᔭᑎᒪᐊᓕᑦ: ᓄᓇᐅᒃ ᐊᕙᑎᐊᓂ ᐊᐅᓚᑎᑦᑎᔮᐅᕙᑦ ᑐᓂᓱᓚᐅᖅᑭᒪᑕ ᐊᐅᓚᐄᓇᕈᑦ ᓇᖅᑐᓂ ᖃᓄᕐᓕᐊᑦᕙᓯᓐᓂ ᐃᓱᒪᕆᔭᖅᓴᑎᓐᓂ • Les opérateur locaux n'ont pas soumis des systèmes de production adéquats pour notre considération.



Scale • 1:1 000 000 • Échelle

Contours in Metres • Lambert Conformal Conic Projection • Projection conique conforme de Lambert • Courbes de niveau en mètres

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Data Atlas
Atlas—données 1982

can be expected to provide appropriate production systems during the next 20 years. The development phase would include the installation and operation of all production facilities (Figure 23). All major construction would take place in southern Canada, followed by shipment and installation on site. Facilities would include warehouses, fuel storage, jet airstrips, an oil tanker terminal, an oil tank farm, a gas liquefaction plant, and some permanent staff housing. This phase would require a labour force of several hundred, plus substantial quantities of gravel, sand, and other construction aggregates, as well as a number of cargo ships to transport components from southern Canada.

The production phase would involve a modest labour force of 100 to 150 people on a year-round basis. The estimated production rate would require one oil tanker every three days and one LNG tanker per week throughout the year. This could mean 20–30 tanker transits through eastern Lancaster Sound per month to and from a marine terminal, likely to be situated at Croker Bay or Dundas Harbour. This tanker traffic would be in addition to the transits through Lancaster Sound and Barrow Strait to and from points further west, as mentioned in the previous section "Shipping."

Implications

Oil and gas development and production in Lancaster Sound would bring with it various economic benefits. It would contribute to Canada's energy self-sufficiency and lead to the development of improved technologies in the oil and gas industry. A producing oil field would contribute to the security of Canada's supply of oil and, by reducing reliance on imports, improve Canada's balance of payments.

Depending on production capabilities of the fields and on the provisions of the royalty scheme, oil and gas production could generate very significant revenues. In addition, both federal and territorial governments could collect corporate, personal and other taxes.

The production phase would provide some job opportunities to the region on supply ships and barges and at the land-based facilities. Development of local service industries would also create some employment and business opportunities for residents. Transportation charges for basic goods shipped by sea or air to the communities could be reduced as shipping volume increases.

The construction and operation of a shore-based marine terminal would have similar implications for the environment as those mentioned in regard to the exploration phase. However, being regular, year-round and permanent over a period of 20–30 years, the movement of ships and onshore activities would pose ongoing, long-term disruption of seabirds and mammals. Animals potentially affected would include migrating white whales, summering walruses, breeding or moulting ringed seals, denning polar bears, and summering muskoxen.

The construction and operation of the offshore production facilities would create impacts similar to those of the exploratory drilling and associated activities referred to previously, but would be of far greater intensity. However, the continuous normal operation of sub-sea production equipment with its associated noise would not be expected to be a hazard to marine life because of the great water depths and the high levels of ambient underwater noise assumed to exist in Lancaster Sound.

Oil development and production are considered to be more hazardous than the exploration phase because of the probability of a major oil spill either through a blow-out from one of the many wells drilled during the development phase, from a tanker accident during the production phase, or from small, but frequent, operational discharges.

Large-scale crude oil spills from a damaged tanker, sub-sea production platform, or underwater pipeline would pose the most serious threat to the offshore and coastal marine life. Driven by variable currents and winds, this pollution would be a potential environmental hazard almost anywhere in the Lancaster Sound and northwestern Baffin Bay areas, especially where the oil is likely to concentrate on the shorelines, in coastal water, or along the landfast ice edges of southern and southeastern Devon Island and northern Bylot Island.

Hunting and trapping patterns may not be directly or immediately affected by the physical disturbances of development and production activities since Inuit do not now hunt off southeastern Devon Island nor in eastern Lancaster Sound during the open-water season. However, Inuit have not abrogated their interests in these areas in which they hunted until very recently. If previous hunting patterns that did include these areas were resumed, conflicts could arise.

Communities rely upon extensive areas of land and sea to produce needed country food. Environmental disturbances in one part of Lancaster Sound may well affect renewable resources and hunting in other parts of the region. The resulting indirect displacement of animals or population fluctuations may necessitate changes in Inuit hunting patterns. The ringed seals, seabirds, and marine mammals in the Arctic Bay and Pond Inlet hunting areas would be particularly susceptible to such year-round disturbances. Consequently, the intensity of hunting terrestrial wildlife populations could increase significantly, possibly leading to overexploitation. If wildlife scarcity developed for this reason or because of pollution, special subsidies or compensation payments to residents of Arctic Bay and Pond Inlet could be needed.

Mining

Based on mineral exploration activities to date, two areas geologically favourable for the occurrence of lead and zinc minerals have been delineated in the Lancaster Sound region. One is at Strathcona Sound and the other on Little Cornwallis Island (Figure 24).

Within these favourable areas, three deposits of economic significance have been outlined. One is presently in production at Nanisivik on Strathcona Sound; another, the Polaris deposit on Little Cornwallis Island, is being developed; and the third, Eclipse, also on Little Cornwallis Island, is a potential producer. (Further description of some mining prospects are given in Appendix C.) Exploration activities will tend to concentrate in those few areas where there is a good possibility of other economically viable deposits being discovered. Exploration activities for other base metals, coal and uranium will also continue in the region.

As previously mentioned, the only producing mine at the present time, Nanisivik, will be phased out of production in approximately eight years unless other economic ore deposits are discovered in the immediate area. The Polaris Project (Arvik mine) may, however, be the beginning of major mineral development activities in the Lancaster Sound region. If the project can overcome difficult operating conditions, and if lead-zinc prices increase, there is the possibility that additional operating mines will come into existence during the period under review.

If new mining operations were to begin, they would require construction of on-site storage and operating facilities, and possibly town sites with associated facilities such as shipping docks, roads, airstrips, and areas for tailings disposal.

Implications

Direct job opportunities at the mines would exist during both the development and production phases. Employment and business opportunities would be available locally and would tend to increase incomes, create jobs in associated activities, and reduce dependency on government transfer payments. Associated activities such as marine transport of supplies to the mines, or aircraft chartered for movement of rotational work crews, would improve transportation and communications and create additional employment and business opportunities within the region and the shipping industry. Furthermore, communities in the region may benefit from the reduced freight rates associated with the additional transport facilities available to the mines, depending on the proximity of future mines to existing communities.

Direct and indirect revenue through corporate and personal income taxes and royalties would accrue to the federal and territorial governments. Canada's balance of payments and knowledge of the North would be strengthened through increased northern mineral activity under Canadian control.

There are, however, environmental concerns connected with mining in the Lancaster Sound region.

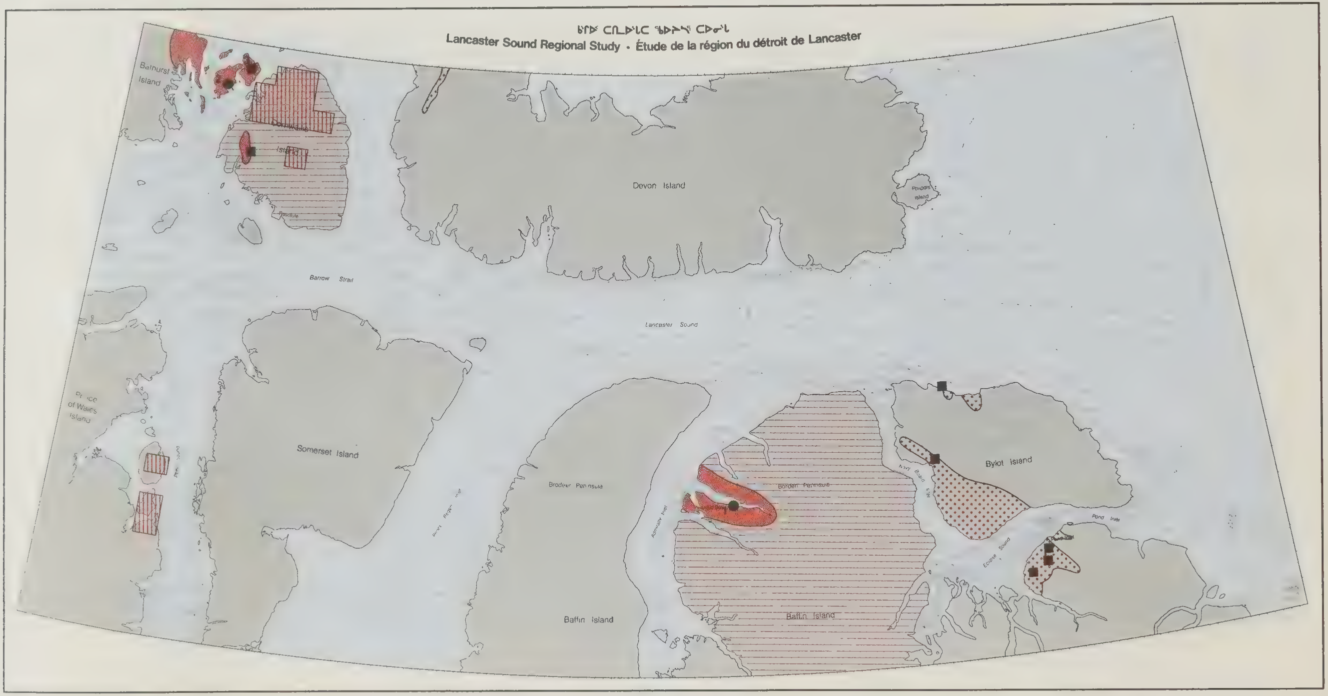
Mining: Potential • ᐅᔭᕋᒃᑕᕐᓂᐊᕐᕕᑦ: ᐊᑐᖅᑕᐅᔪᓐᓇᖅᑐᑦ • Exploitation minière: potentiel

- Unknown Mineral Potential • ᓴᕕᕋᔭᒃᓴᖃᓛᖅᑕ ᖃᐅᔨᔭᐅᖏᑦᑐᑦ • Potentiel minéral inconnu
- Favourable Geology and/or Limited Mineral Resources • ᓴᕕᕋᔭᒃᓴᑲᕋᓯᒋᔭᐅᔪᑦ ᓴᕕᕋᔭᒃᓴᖅᑐᓗᓂᑦ ᐊᒥᓱᐊᒥᑐᒥᑦ • Géologie favorable ou ressources minérales limitées
- Mineral Deposits and Favourable Geology • ᓴᕕᕋᔭᒃᓴᖅᑐᑦ ᓴᕕᕋᔭᒃᓴᑲᕋᓯᒋᔭᐅᔪᓗ • Gisements minéraux et géologie favorable
- Coal-bearing Rocks • ᕿᔪᖕᓴᖅᑕᓖᑦ ᐅᔭᕋᑦ • Roches carbonifères
- Coal Occurrences • ᕿᔪᖕᓴᖅᑕᓖᑦ • Venues carbonifères

Lead and Zinc • ᓴᕕᕋᔭᒃᓴᓂᐊᕐᕕᑦ ᓚᕿᒥᑦ ᔾᔫᒥᓗ • Plomb et zinc

1. Producing Mine: Nanisivik • ᐅᔭᕋᒃᑕᕐᓂᐊᕐᕕᐅᔪᓂᓗ: ᓇᓂᓯᕕᒃ • Mine productive: Nanisivik
2. Near-term Producer (1982): Arvik (Polaris Deposit) • ᐅᔭᕋᒃᑕᕐᓂᐊᕐᕕᐅᕙᓕᕐᑐᖅ (1982): ᐊᕐᕕᒃ (ᐅᓗᑎᒪᐊᕐᕙᐊᖅ) • Mine productive à court terme (1982): Arvik (gisement Polaris)
3. Potential Producer: Arvik (Eclipse Deposit) • ᐅᔭᕋᒃᑕᕐᓂᐊᕐᕕᐅᑐᐃᓐᓇᑎᒪᐊᓕᑦ: ᐊᕐᕕᒃ (ᑕᓕᓯᒪᕙᖅ) • Producteur éventuel: Arvik (gisement Eclipse)

Mining Prospecting Permits • ᓴᕕᕋᔭᒃᓯᐅᕐᕕᐅᕙᑦ ᐱᔪᓐᓇᐅᑎᖃᖅᑐᓄᑦ • Permis de prospection minière



Scale • 1:1 000 000 • Échelle

Kilometres / Kilomètres

Statute Miles / Milles terrestres

Nautical Miles / Milles marins

Contours in Metres • Lambert Conformal Conic Projection • Projection conique conforme de Lambert • Courbes de niveau en mètres

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Sources for Base Map:
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Data Atlas
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Atlas données 1982

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Exploration activities may cause some disturbance to the currently small populations of caribou and muskoxen on Cornwallis and Little Cornwallis islands, or the few barren-ground caribou now present in the Strathcona Sound area. Disruption of their seasonal movements may further endanger the survival of these local populations.

Development and production activities associated with the Arvik Mine site may cause disturbance of the walrus population in McDougall Sound. In particular, nearby ship movements and low-level overflights in summer may interfere with the use of the Brooman Point haul-out site, located about 12 km from the mine site. These activities could also disturb the migratory movements of caribou and muskoxen between Bathurst, Cornwallis, and Little Cornwallis islands during the winter. In addition, passing ore carriers may occasionally disrupt the hunting of sea mammals by Resolute hunters in McDougall Sound.

Social stability could be threatened if families move out of the community to take up wage employment at the new mines or if family members are absent on rotational employment, as is planned for Arvik in response to requests by the communities.

Preservation of Natural Areas

There are several programs aimed at designating land and marine areas in Lancaster Sound to protect outstanding natural features and critical biological resources. Parks Canada may set aside national parks and Canadian landmarks. The International Biological Programme (IBP) has identified a number of significant ecological sites for protection (Figure 25) which could be preserved under existing Canadian legislation. The Canadian Wildlife Service has selected critical wildlife habitats, covering, in part, the same areas as those identified by IBP; these could be designated as national wildlife areas under the Canada Wildlife Act. The Bylot Island Migratory Bird Sanctuary already exists to protect the snow goose colony there.

Parks Canada activities include the identification and setting aside of marine and terrestrial areas for purposes of preservation, recreation, and interpretation. This would preclude non-renewable resource development and certain other uses. However, it is current Canadian government policy to assess the non-renewable resource potential of an area prior to the establishment of a national park.

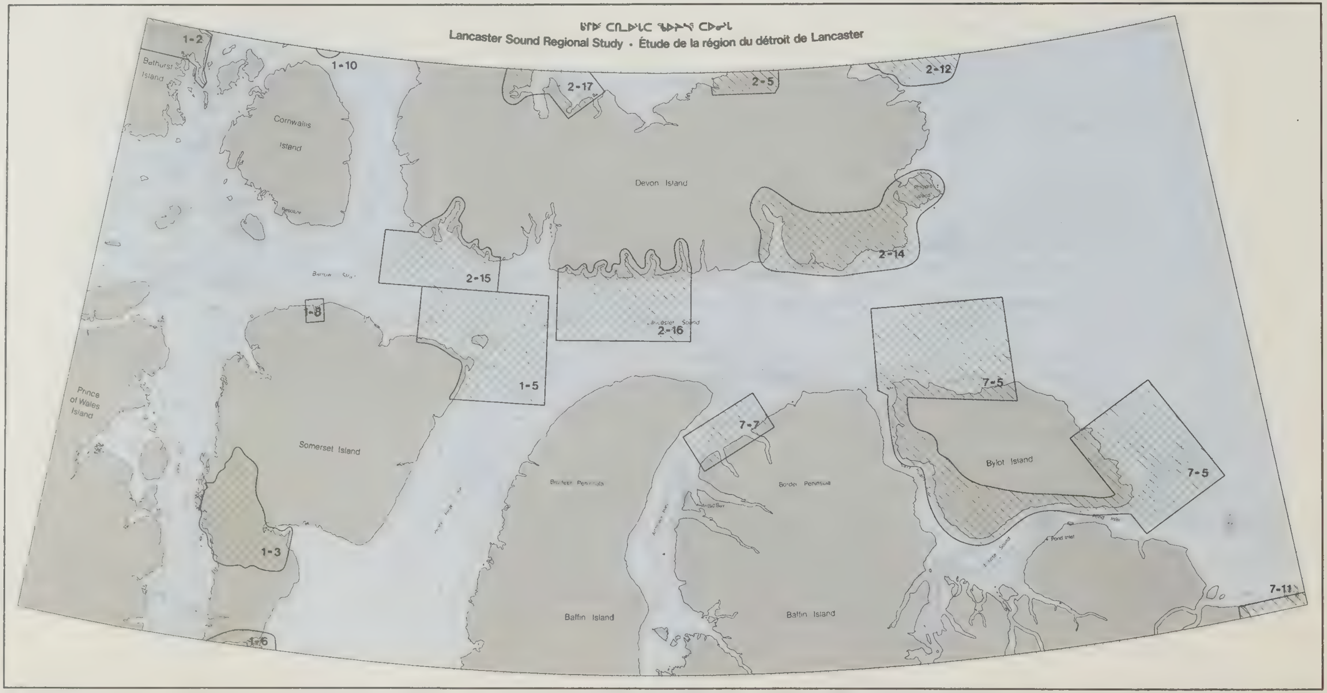
National parks are created according to a nation-wide systems planning process undertaken by Parks Canada in consultation and co-operation with the appropriate provincial or territorial agencies and the Department of Indian Affairs and Northern Development. The process is based on the "natural regions" concept and includes the identification and analyses of each region's natural areas of Canadian significance (NACS). Parks Canada's goal for national parks is to have each of the natural regions represented in the system of national parks. From the identified NACS, potential national parks are selected within each region. Then public feasibility assessments, additional studies, and new park negotiations are undertaken to determine whether or not new national parks should be established, under what conditions, and having what boundaries.

Three such terrestrial NACS and one marine NACS have been identified by Parks Canada in Lancaster Sound (Figure 26). Three additional marine areas of interest in Lancaster Sound have also been identified, and require further evaluation before their status can be determined.

To determine a definitive Parks Canada position for the Lancaster Sound Regional Study, a detailed comparison of the three terrestrial NACS located in the Lancaster Sound region, plus another in the Foxe Lowlands of west Baffin Island, was undertaken by a consultant to Parks Canada in early 1981. The comparison included reference to a variety of factors such as natural resource representation and the possible social and economic consequences of establishing parks. The study also examined and compared the marine areas of interest in the eastern arctic marine region. Four of the seven marine areas studied fell within the Lancaster Sound region. The overall conclusion of the study was that the best area for a national park proposal would be in the Bylot Island-

Ecological Sites (I.B.P.) • ᓂᕐᔪᑎᓄᑦ ᓄᓇᒥᑎᑕᐅᔪᑦ (ᓄᓇᕐᔪᐊᓕᒪᒥ) • Sites écologiques (P.B.I.)

- Significant Ecological Sites • ᓄᓇᒥᑕᔾᑲᐅᕐᓂᕐᒥᓄᑦ ᐅᔾᔨᕐᓇᖅᑐᑦ • Importants sites écologiques
- 1-5 IBP Designated Numbers • ᓄᓇᕐᔪᐊᓕᒪᒥ ᓂᕐᔪᑎᓕᕆᔨᓄᑦ ᑲᒪᔨᔭᐅᕐᑲᑕᖅᑐᑦ • Nombres désignés par le PBI



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Scale • 1:1,000,000 • Échelle

Kilometres / Kilomètres — Statute Miles / Milles terrestres — Nautical Miles / Milles marins

Contours in Metres • Lambert Conformal Conic Projection • Projection conique conforme de Lambert • Courbes de niveau en mètres

References • Références
Data Atlas
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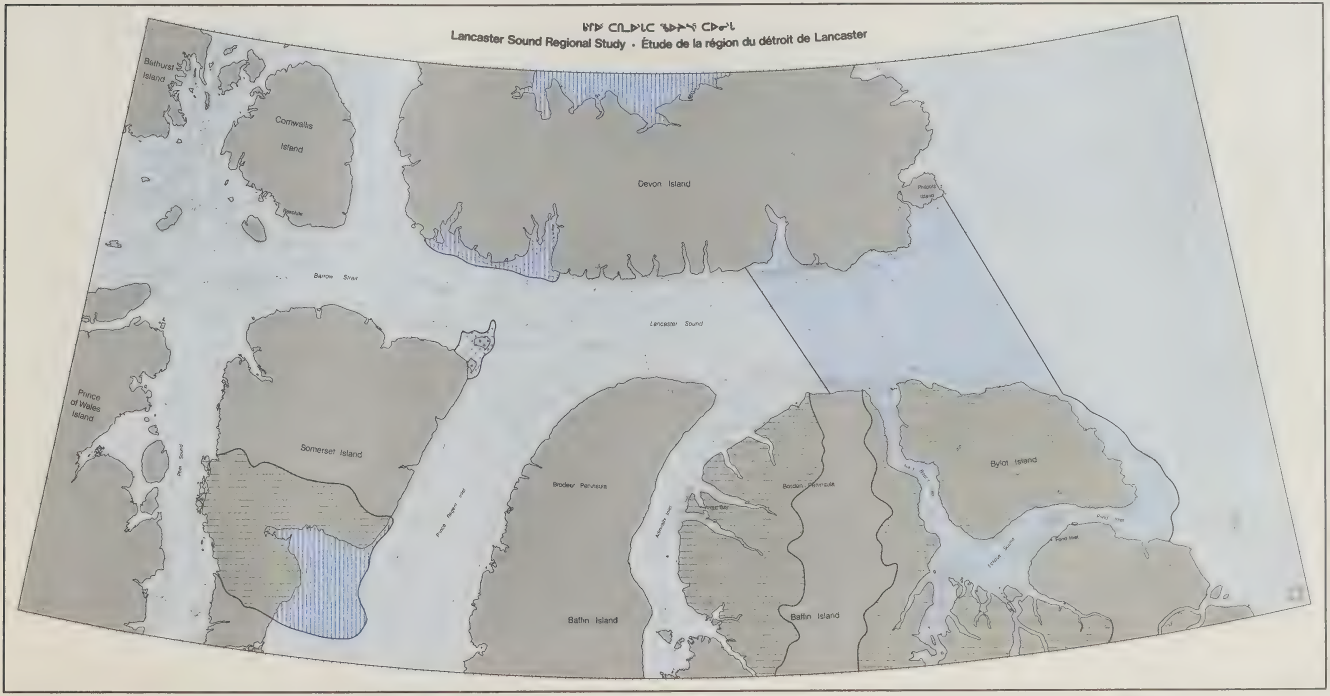
Atlas – donnees 1982

Parks Canada's Areas of Interest • ᑲᓇᑕᐅᑉ ᑳᔾᔪᓐᓇᖅᑐᓂᑎᓗᔅᓯᑕ ᐱᒃᑯᒥᒋᔭᖅᓯᑦ • Régions d'intérêt de Parcs Canada

- Terrestrial Natural Areas of Canadian Significance • ᓄᓇᐃᑦ ᑳᔾᔪᓐᓇᖅᑐᑦ ᑲᓇᑕᒥᐅᒍᓂᕐᒧᑦ • Régions terrestres naturelles d'importance nationale
- Natural Site of Canadian Significance • ᑳᔾᔪᓐᓇᖅᑐᑦ ᑲᓇᑕᒥᐅᒍᓂᕐᒧᑦ • Zones naturelles d'importance nationale
- Marine Natural Area of Canadian Significance • ᑕᕆᐅᒥ ᑳᔾᔪᓐᓇᖅᑐᑦ ᑲᓇᑕᒥᐅᒍᓂᕐᒧᑦ • Régions marines naturelles d'importance nationale
- Preliminary Marine Areas of Interest • ᖃᐅᔨᓴᖅᑕᐅᓚᐅᖅᑐᑦ ᑕᕆᐅᖅ • Régions préliminaires d'intérêt marin



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Sources for Base Map:
International Map of the World 1:1 000,000 NS-12-20 Ottawa, Canada Department of Energy, Mines and Resources, 1978
Natural Resource Map Bathymetry 1:250,000 26140-A, 26145-A, 26240-A, 26245-A, 26310-A Bathymetric contours interpreted by Nancy N. Finlayson. Ottawa, Canadian Hydrographic Service, Department of Fisheries and Oceans, 1976.
General Bathymetric Chart of the Oceans (GEBCO), Bathymetry Plotting Sheets, 1:1,000,000, N17-15, N17-16. Bathymetric contours interpreted by David Monahan. Ottawa, Canadian Hydrographic Service, Department of Fisheries and Oceans, 1979

Scale • 1:1 000 000 • Échelle
Kilometres / Kilomètres
Statute Miles / Milles terrestres
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Carte générale bathymétrie des océans (GEBCO), bathymétrie. Feuilles d'ébauche, 1:1.000,000, N17-15, N17-16. Contours bathymétriques interprétés par David Monahan. Ottawa, le service hydrographique du Canada, Ministère des Pêches et Océans, 1979

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Atlas—données 1982

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Eclipse Sound area with combined terrestrial and marine environments. The combination of highly ranked marine and terrestrial environments was not equalled elsewhere.

Parks Canada is initiating a new program called Canadian Landmarks. A Canadian landmark would be an area identified on the basis of its significance and uniqueness both nationally and internationally. These sites would generally be smaller than NACS. Prince Leopold Island is of interest to Parks Canada as a potential Canadian landmark.

The selection of IBP sites is a separate undertaking from the Parks Canada program. Sites that have been identified include those with unique plant associations and/or rare or endangered bird and mammal populations and those that are critical breeding, feeding and staging habitats. These sites would be set aside to protect wildlife, to conduct scientific research, and to ensure the continuance of unique ecosystems and ecosystem processes. There would be no encouragement of tourist or recreational uses of these sites.

[2]This convention was adopted by the UNESCO member states at the 1972 General Conference in order to give international protection to cultural and natural areas of worldwide importance. Canada acceded to this convention on July 23, 1976.

Lancaster Sound is also a potential world heritage site and could be designated under the Convention Concerning the Protection of the World's Cultural and Natural Heritage.[2] The recent World Conservation Strategy, prepared by the International Union for the Conservation of Nature and Natural Resources (IUCN), includes Lancaster Sound in a biogeographical province where establishment of protected areas should have high priority.

Not all areas of biological or ecological importance have been included in existing preservation proposals. Some areas such as the southern end of Admiralty Inlet and the Steensby Peninsula, and the coastal waters of northern Brodeur Peninsula, are biologically important areas, but so far have not been identified for possible protection by any of the above programs.

Implications

Allocation of selected parts of the region as national parks and other types of conservation lands could serve to preserve significant natural, cultural, and historic resources of national importance. In some cases, such action could aid Canada's national and international obligations to preserve representative and unique areas. For example, the International Agreement on the Conservation of Polar Bears and the Migratory Birds Convention commit Canada to protect the species involved. As a signatory to the Convention Concerning the Protection of the World's Cultural and Natural Heritage, Canada has also committed itself to the protection of sites considered to be of universal significance.

Parks Canada is prepared to implement measures that will make the national park concept more suited to northern areas. Renewable resource harvesting in national parks by local Inuit would be the subject of agreements to be worked out between Parks Canada and the native people. Generally, food hunting and domestic fishing traditions would be honoured, but sport hunting would not be permitted. Controlled sport fishing of naturally regenerating populations of native species could be permitted within parks unless there was a conflict with local native use. Non-renewable resource development would be constrained in parks and nature reserves.

Tourism-related activities would be expected to expand with the development of parks, creating employment and business opportunities for local Inuit. As further outlined in the following section, such activities could include managing tours, outfitting, guiding, providing transportation and accommodation, and selling arts and crafts. As has been the experience with other northern parks, the number of park visitors would be expected to increase steadily from year to year.

A possible consequence of increased tourist activities is, however, that they could cause some degradation of sensitive habitats and detrimental impacts on wild-

life populations. To eliminate such threats, land use zoning and other strict controls would be applied within parks.

The designation of a number of potential preservation areas, together with a program for assessing their resource potential, may require increased government expenditures. Areas may, however, be *tentatively* set aside for protection purposes prior to carrying out detailed evaluation of their resource potential.

Tourism and Recreation

Within the Lancaster Sound region today, Pond Inlet is the only community with an active tourist business; arctic char fishing is the main attraction at nearby Robertson River. Some travellers visit Bylot Island and other mountainous areas for climbing, hiking, and sightseeing during the summer months. Interest in "package tours" has grown considerably in recent years and some tour packages within the Lancaster Sound region are already available.

In the hope of increasing tourism in the future, the government of the Northwest Territories is studying new tourist promotions that may one day be implemented. Natural history tours involving ship excursions, aircraft overflights, and observational camps would focus on the spectacular scenery and wildlife areas of Admiralty Inlet, northern Bylot Island, Creswell Bay, the Devon Island ice cap, and other locations (Figure 27). Glacier skiing and mountain climbing could be exciting adventures on Devon, Bylot, and northern Baffin islands. Seals, whales, polar bears, and icebergs could be viewed from small boats travelling the coastal waters of Eclipse Sound and Navy Board Inlet. Historic sites such as the camps and cairns of explorers and the ancient Thule settlements are also potential tourist attractions.

Industrial facilities and operations such as mine sites, oil and gas production bases, harbours, and ports could also be of interest to tourists, especially in remote areas where new engineering technologies are featured. Conversely, a major oil spill could produce serious and long-lasting damage to the pristine physical environment and abundance of wildlife on which tourism in the Arctic is based.

Promotion of arctic tourism would have to be directed toward people interested in special or unusual experiences. It would therefore be a mistake to confine such promotion to southern Canada, particularly since even now most visitors to the Canadian Arctic are Europeans and Americans.

Implications

An important benefit of tourism in the region would be an increase in job opportunities. Employment for residents from tourism and recreation could include positions as managers, tour guides, cooks, park attendants, and boat and snowmobile operators. Many related jobs would also be based in the communities. Moreover, if tourism could be extended over a longer period of the year by means of off-season tours or other activities, jobs and other economic benefits could continue for most of the year.

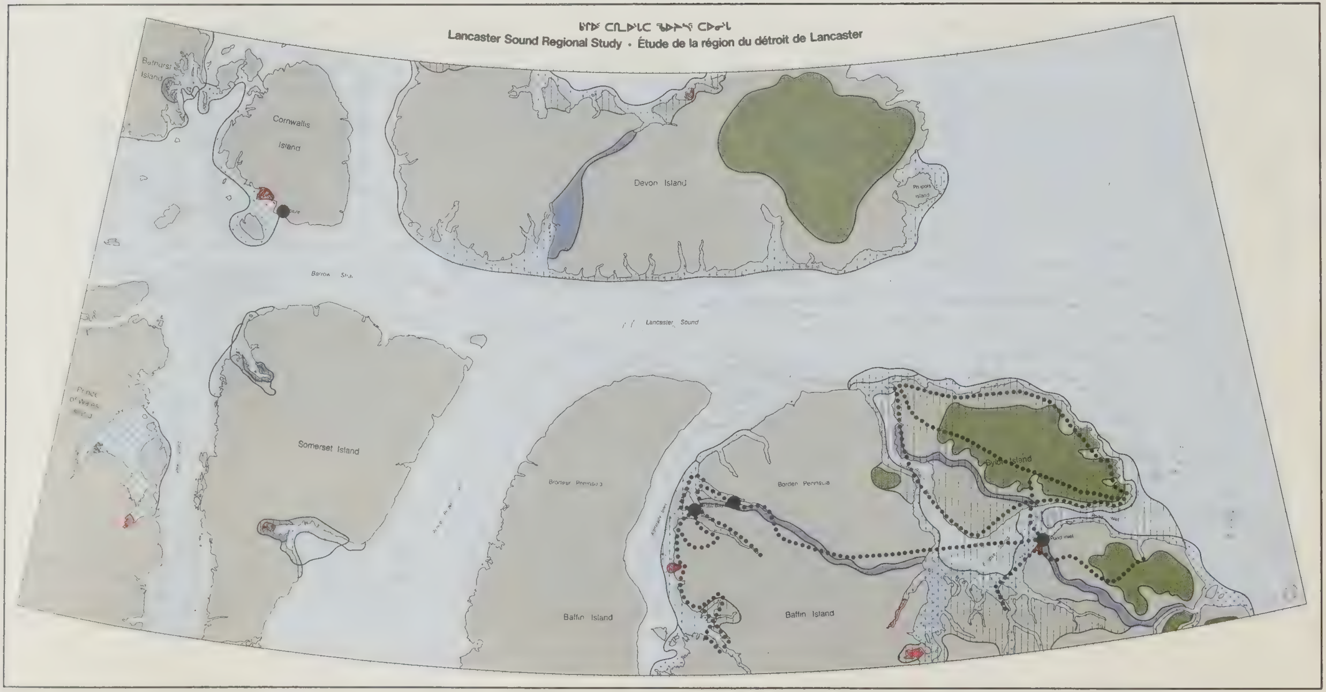
Regardless of the season, the production and sale of skin and fur handicrafts, bone and stone carvings, or local souvenirs could offer steady employment and a source of cash income for native artists, crafts people, distributors, and store owners. Local co-operatives and small businesses could be encouraged by incentive grants or loans. Such measures would help to ensure that the tourist industry did not become dominated by non-resident commercial interests.

Arctic tourism is relatively compatible with community life and preferred Inuit lifestyles. In addition, it is an industry that the Inuit could largely control and one that probably has a longer life span than that of the currently envisaged non-renewable resource extraction projects. A flourishing tourist industry could thus contribute to long-term community stability and security.

There are, however, some environmental concerns associated with an enlarged tourist industry. For example, overfishing of arctic char populations by tourists could result unless the fishery is carefully managed through catch limits and seasonal restrictions. Locales of domestic fishing would often be the same as those favoured by tourists so that integrated man-

Tourism: Potential • ᐱᖑᐊᕐᕖᑦ ᐊᓯᕙᖑᐊᕐᕕᐅᓗ ᓂᐅᑭᔭᓄᑦ: ᐊᑐᖅᑕᐅᔭᓐᓇᖅᑐᑦ • Tourisme: potentiel

- Tourism Staging Points • ᑕᑯᒥᐅᑎᒪᕐᕕᖕᓂᑦ ᐱᑭᐊᕐᕕᐅᔪᓐᓇᖅᑐᑦ • Haltes touristiques
- Sports Fishing • ᐃᖃᓗᓐᓂᐊᕐᕕᐅ • Pêche sportive
- Boating • ᐅᒥᐊᖅᑐᕐᕕᐅ • Canotage: actuel
- Nature Viewing • ᐊᕙᑎᒥ ᐅᒪᔪᓖᓐᓄᓪᓗ ᓇᐅᔨᑐᕐᕕᐅᔭᕈᑐᖅ • Observation de la nature
- Mountain Climbing • ᕿᑲᓂᑦ ᒪᔪᕐᓂᖅ • Escalade
- Camping/Hiking • ᓯᓂᒃᑕᒪᐊᖅᑐᕐᓂᖅ ᐱᓱᒐᓗᑭᔪᕐᓂᕐᓗ • Camping/excursions
- Cross-Country Skiing Routes • ᓯᕿᕐᕕᐅᓯᑦ • Sentiers pour le ski de fond



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agement of fish stocks would be needed to ensure the long-term viability of both domestic and sport fishing.

Care would also have to be taken to ensure that archeological sites were not disturbed or destroyed, either by tourists or by residents wishing to secure artifacts for sale to tourists.

Hunting and trapping by Inuit would probably be little affected by expanded tourist activities. At present, non-residents are entitled to hunt a few species such as the polar bear, but only under very restricted conditions. Special care would, however, be required to reduce possible conflicts between sightseer-photographers and Inuit during the annual hunts.

Hunting, Fishing and Trapping

Hunting, fishing and trapping are expected to continue as integral parts of Inuit lifestyles in the Lancaster Sound region. Levels of wage employment, where available, will probably increase and pay for the higher costs of sophisticated equipment such as snowmobiles and alternative methods of travel, such as aircraft charters. A growing number of Inuit may also seek employment outside the region for varying periods to maintain current lifestyles based on a combination of hunting and employment.

The major issue related to hunting, fishing and trapping is the continued viability of these activities. The potential loss of habitat through incompatible industrial activities or major oil spills, the loss of access to hunting areas through the creation of conservation lands, and increasing hunting and fishing pressures, resulting from human population growth, are all factors to be taken into account.

Implications

Until recently, Inuit hunted over a much wider area of land and sea than they do at present. This previous range included most of Lancaster Sound itself. Inuit have never abrogated their interests in these areas and identify them as ones that have the potential to be used again for hunting, fishing and trapping.

Even if some young Inuit leave the area permanently to seek opportunities elsewhere, hunting pressures on the fish and wildlife resources near the communities will increase as the human population continues to grow. Some species may become locally or seasonally scarce, although one preferred species, the ringed seal, can probably withstand greater hunting pressure because of its abundance throughout the region. An increase in the use of outpost camps and chartered aircraft may result in larger harvests of animals in areas remote from the settlements.

"Country food" will continue to be important to the Inuit of the Lancaster Sound region. The projected growth of the Inuit population could require a substantial increase in current harvests by the year 2000.

To keep pace with the expected needs of this population, more complete use of marine mammals such as narwhal, beluga and walrus will likely be necessary. Intersettlement trade of the products and by-products of the hunt could provide a partial solution to the present incomplete use of resources.

Additionally, schemes to harvest alternative food species such as arctic cod could be instituted. Co-operative projects by Inuit and government, including the development of appropriate harvesting technologies, would be needed to make such schemes successful.

To ensure sustained yields of caribou, a preferred food species, careful management would be required. Immediate steps would have to be taken to determine accurately herd sizes and sustainable harvest levels on north Baffin, Somerset and Prince of Wales islands.

The economic viability of trapping and hunting of furbearing animals is affected by unpredictable fluctuations in fur prices. Floor prices on furs to cushion the northern economy against these fluctuations may be necessary and should be seriously considered.

The establishment of parks and reserves may limit Inuit hunting in certain areas. However, by protecting important wildlife habitat, such reserves would help to maintain game stocks in the region, thereby assuring continued renewable resource harvesting for the Inuit.

In fact, if the Inuit lifestyle in the Lancaster Sound region is to be based on a combination of resource harvesting and wage employment, increased efforts for the conservation of wildlife resources will be vital.

Government assistance will be required for effective management to prevent environmental degradation, to help develop new harvesting technologies and alternative food uses, and to market by-products of the hunt.

Appendix C
Existing Projects and Current Proposals for Non-renewable Resource Exploitation and Transportation

Hydrocarbon Transportation Proposals for the Northwest Passage

Various proposals have been made for year-round marine transportation of oil and natural gas through the Northwest Passage. Although these hydrocarbons originate outside the Lancaster Sound region, their transport has implications for planning future uses of the region. The details of each project are not completely known, however, and may be subject to change because of technological advances or other considerations.

The Arctic Pilot Project application has been jointly filed by Petro-Canada, Dome Petroleum, NOVA (formerly Alberta Gas Trunk Line Company Limited), and Melville Shipping Limited. This pilot project would involve construction of a natural gas pipeline, barge-mounted storage and liquefaction facilities, and tanker transport of liquefied natural gas (LNG). The system would use a 56-cm diameter pipeline to transport gas 160 km from the Drake Point field on Melville Island to Bridport Inlet on the Island's south coast. At Bridport Inlet, the gas would be liquefied and shipped by tanker to regasification facilities in eastern Canada. Two ice-breaking Arctic Class 7 tankers of 135 000 tonnes with a capacity of 139 909 m^3 (880 000 barrels) would be built. They would each make 14 round trips per year. The system should be capable of moving 7 million m^3 (250 million cubic feet) of gas per day. Project costs are estimated at $1.76 billion and project start-up is planned for 1986. The gas would be destined for the Canadian market, but it has been proposed that twice the equivalent volumes should be released to the United States market from other Canadian sources in order to pay for the project. An Environmental Assessment Review Process (EARP) panel carried out hearings on the project and concluded that it was environmentally acceptable provided certain conditions were met. The National Energy Board expects to hold hearings in early 1982.

Dome Petroleum Limited recently outlined plans for the construction of 110 new vessels over the next 15 years.[1] Included in this planned projection are 25 arctic crude carriers of 200 000 DWT (deadweight tonnes) capacity to transport oil. If oil production commences in 1985 it is expected that these carriers could provide delivery of one million barrels per day by 1990 to southern markets. Ship delivery requirements during this period are reported as:

Year	Number of 200 000 DWT arctic crude carriers
1985	1
1986	1
1987	3
1988	1
1989	1
1990	4
1991	3
1992	3
1993	3
1994	3
1995	2
Total	25

Trans-Canada Pipelines Project, for which an application is expected in 1980, would involve a 77-km long pipeline on Ellef Ringnes Island, natural gas liquefaction facilities on King Christian Island, and three 75 000 deadweight tonne vessels of Arctic Class 10 ice-breaking capability for year-round operation. Project cost has been estimated at $2.4 billion (in 1984 dollars). The origin of the gas would be Ellef Ringnes Island, King Christian Island, and other sources, but its destination is uncertain at present. The project's proponents, Trans-Canada Pipelines and Dome Petroleum, have indicated that project construction might begin in 1986. One of the routes being ex-

[1]Statement read by M.B. Todd of Dome Petroleum Ltd. at the Joint Industry-Government Workshop, Frontier Oil and Gas - The Decade Ahead, Montebello, Quebec, 1981.

amined passes through Wellington Channel, Barrow Strait, Prince Regent Inlet, and through Fury and Hecla Strait to Foxe Basin.

Seatrain is an American scheme for moving oil from Alaska's North Slope to east coast markets via the Northwest Passage, using a fleet of three Class 8 ice-strengthened tankers. Initial estimates call for each of these tankers to make an average of 15 round trips annually.

Globtik Tankers Ltd. has proposed another American scheme, which would carry Alaskan oil to the United States east coast via the Northwest Passage, using ice-strengthened tankers in the 350 000 deadweight tonne range. No information is available on the ice-breaking capability of the vessels. Each of these huge tankers would be capable of carrying 397 469 m^3 (2.5 million barrels) of North Slope oil to Conception Bay, Newfoundland, where it would be transshipped in smaller tankers to United States ports. The initial complement of six tankers would give a system capacity of 79 493 m^3 (500 000 barrels) per day; the fleet would be increased to 24 tankers with a corresponding increase in system capacity.

Globtik Tankers Ltd. has also advanced the concept of transporting liquefied natural gas from Alaska and the western Canadian Arctic, by way of the Northwest Passage, to American and eastern Canadian markets. Using four Class 10 ice-breaking tankers, 11 million m^3 (400 million cubic feet) of gas per day would be transported. The system capacity could be rapidly expanded by increasing the number of tankers to 20. Globtik indicates the cost of transporting Prudhoe Bay gas by tanker would be $11 billion compared with $17.5 billion for the planned Alaska Highway Pipeline.

The United States Coast Guard has recently outlined plans for an early test voyage in winter through the Northwest Passage. The planned dates for these tests are 1983 or 1985 using the USCG heavy icebreakers *Polar Star* or *Polar Sea.* The principal characteristics of the *Polar Sea* are as follows: The 13 000 tonne ship is designed to ram through ice up to 21 feet (6.4 m) thick and to operate continuously through 6 feet (1.8 m) of ice at a speed of three knots (5.5 km per hour) according to a recent Coast Guard document; the ship's three propeller shafts are turned by either a diesel-electric or gas turbine power plant; the diesel electric plant can produce 10 000 shaft horsepower and the gas turbine plant 60 000 shaft horsepower; however, both modes of power cannot be used simultaneously.

Hydrocarbon Exploration

The offshore area of Lancaster Sound contains geological structures with significant potential for oil and gas. Three companies - Norlands Petroleum, Petro-Canada, and Shell Canada - hold the oil and gas permits to approximately 3.2 million ha. No exploratory drilling has yet occurred. Norlands applied for permission in 1976 to drill an exploratory well, but their drilling program was deferred by the government, on the recommendation of the EARP panel that reviewed the application in October 1978. An application is expected from Petro-Canada in 1983 to drill three or four exploratory wells in western Baffin Bay and eastern Lancaster Sound. Drilling for both programs would involve dynamically positioned drill ships operating during the open-water season, and both operations would entail marine, land, and air support.

Mining

Commercially viable lead-zinc and iron ore deposits have been identified in the Lancaster Sound region.

Nanisivik, a lead-zinc operation located at Strathcona Sound on Baffin Island, began production in October 1976. The mine produces 150 000 tonnes of ore annually, which is concentrated on site and stockpiled for shipment during the open water season. With proven reserves of about 8 million tonnes, the mine has an expected life span of 12-15 years. The operation employs approximately 225 persons, and supports a permanent community of about 325 people. Associated facilities include airstrips and a marine terminal.

The Arvik mine (Polaris deposit) is located on the southern part of Little Cornwallis Island. With ore reserves estimated at 23 million tonnes, Arvik will have

a life span of at least 25 years. It will be the eleventh largest lead-zinc producer in the world. Preliminary construction activities are currently under way and the mine is expected to begin operation in 1982.

Cominco's present plans call for the production of 2 050 tonnes per day, to be concentrated and stockpiled for shipment during open-water season. The mine will employ about 240 persons who will be accommodated in bunkhouse facilities. No permanent community is planned. Although only the Polaris deposit is at present under formal development consideration, the Eclipse deposit, located on the north end of Little Cornwallis Island, also contains significant amounts of lead and zinc. Future development of the Eclipse as well as other adjacent deposits is a possibility.

The Mary River iron ore deposits have been identified on Baffin Island, south of Milne Inlet. They contain approximately 130 million tonnes of high grade ore. Although exploratory, metallurgical and economic work has been done, no current plans exist for the development of these reserves.

Coal mining was carried out by the Inuit of Pond Inlet at two separate mine sites on the Salmon River until 1964. In the decade prior to the start of the annual sea lift, an average of 125 tonnes of coal was mined each year. As oil and gas prices continue to rise, coal mining may well resume as a source of local energy at reasonable costs.

Appendix D
Study Organization and Methodology

Study Organization

The Lancaster Sound Regional Study is a project of the Northern Affairs Program of the Department of Indian Affairs and Northern Development (DIAND), undertaken in collaboration with the federal departments of the Environment (DOE), Fisheries and Oceans (DFO), Energy, Mines and Resources (EMR), and Transport (DOT), and the government of the Northwest Territories (GNWT). Because of the interdepartmental nature of the study, a two-tiered organization has been set up comprising a steering committee and a working group. The steering committee, made up of representatives of these agencies, gives general direction to the study. Membership of the committee is as follows:

Director General, Northern Environment, DIAND - Chairman
Director, Northern Economic Development, DIAND
Director, Northern Environmental Protection, DIAND
Director, Major Projects Assessment, DIAND
Director, Non-renewable Resources, DIAND
Assistant Director, Renewable Resources, Northwest Territories Region, DIAND
Secretary of Executive Committee, GNWT
Director General, Western and Northern Region, DOE
Chief, Parks System Planning, DOE
Director, Special Projects, Coast Guard, DOT
Chief, Ocean Science Affairs, DFO
Chief, Marine Habitat, DFO
Head, Office of Environmental Affairs, EMR
Co-ordinator, Renewable Resources Planning, DIAND - Secretary

In addition, the departments of National Defence and External Affairs are represented on the committee by permanent observers.

The responsibility for the initial part of the study (data base and draft green paper) was given to a working group composed of the following members:

H.J. Dirschl, DIAND - Project Manager
D. Bissett, DIAND - Socio-economics
B.J. Britton, GNWT - Socio-economics
J.A. Dobbin, James Dobbin Associates Ltd., Toronto - Coastal and ocean planning,
A. Geddes, DOT - Marine transportation
B.A. Gibson, DIAND - Legislation and regulations
J.T. Inglis, DIAND - Terrestrial biology
S.A. Kanik, DIAND - Non-renewable resources
J.S. Loch, DFO - Marine biology
D.C. McKay, DOE - Climatology
G.G. McLean, DOE - Preservation of natural areas
J.N. Parker, DIAND - Regional economic planning
B.R. Pelletier, EMR - Geology and geomorphology
D.B. Smiley, DFO - Oceanography

Consultant and support services to the working group were provided by:

A.M. Ault - Environmental planning
James Dobbin Associates Limited - Coastal and ocean planning
K. Harper - Community liaison and socio-economics
T. Lee - Administrative assistance
H.M. Myers - Research assistance
N. Saab - Secretarial

The working group's task included gathering and summarizing all available information relevant to the project and analyzing marine and land use patterns. This involved the compilation of a data base, consisting of a preliminary data atlas and of 12 background reports (see Appendix E for a complete listing).

The working group also prepared an initial draft text of the green paper, which was reviewed by the steering committee. The recommended revisions were then initiated by the Project Manager, H.J. Dirschl, who also was responsible for the final editing of the text. Individual members of the working group contributed substantially to the revision and finalization of specific parts of the paper, and provided comments on the manuscript as it was being edited.

Following the public review of the draft green paper, updating and revisions were undertaken and the final green paper was written by H.J. Dirschl, A.M. Ault, and H. Mills. J.T. Inglis assumed responsibility for map revisions, while K. Harper updated the socio-economic and renewable resources information.

Methodology

The Lancaster Sound Regional Study was organized into three main phases. The first phase involved the preparation of the draft green paper with its associated maps and reports; the second, the public review of the draft documents; and the third, the preparation of the final green paper, including the incorporation of the results of the public review.

Phase One: Preparation of the Draft Green Paper

Data collection

During the first phase of the study, working group members compiled and summarized all available information relevant to the project. As a first step, background reports were prepared on the following topics: selected physical characteristics; selected biological characteristics; socio-economic characteristics and conservation interests; non-renewable resources and transport; and jurisdictions and legislation (see Appendix E for complete listing).

Concurrently, information on the Lancaster Sound region was also summarized in map and written form in a preliminary data atlas with accompanying map descriptions. This atlas contains 83 thematic maps at the scale of 1:2 million. The maps deal with important coastal and oceanic processes, animals and their habitats and functions, resource harvesting areas, and commercial activities. They also illustrate potential activities in the region over the next 20 years, such as shipping, hydrocarbon exploration, and the establishment of parks and reserves. The atlas was distributed in draft form to allow for incorporation of new data obtained during the public review phase.

The information summarized in the background reports and presented in the preliminary data atlas provided the background for preparing the draft green paper. These documents were distributed in Inuktitut as well as the official languages. They were made available for reference to interested agencies and institutions, the general public, and the residents of the region for their review and comments.

Data analysis

Approach: Following the compilation of the data base, existing and potential activities in the region were analyzed using a variety of methods and tools. A systematic mapping and planning approach, developed by James Dobbin, was used by the working group to examine the relationships among biological, physical, and socio-economic factors, and potential activities within the Lancaster Sound region. The approach also called for the preparation of map overlays. These overlays provided a flexible and efficient means of using selected information from the data atlas to identify and illustrate key features of the region, to verify or test certain assumptions about the region, and to refine the analyses. In some cases, the mapped and written information was sufficiently detailed to allocate weightings in various colour intensities to reflect the relative importance of specific data, e.g., critical habitats for various animals. The approach also enabled members of the working group to consider characteristic seasonal patterns.

Establishing the Existing Regional Framework: During the preliminary analysis by working group members, the overlays were combined to arrive at composite maps, illustrating physical environmental characteristics, critical habitats, resource harvesting and commercial activities in ice-covered and open-water seasons.

Analyzing Potential Activities: Members of the working group proceeded with the analysis by considering potential future activities. Projections of the nature and scope of activities such as shipping, oil and gas exploration and development, mining development, and preservation of natural areas were prepared for the years 1980–2000. Changes in the environment, the economy, harvesting patterns, and the communities as a result of each activity were identified by relating the future activities to the existing regional framework. Areas of likely conflict were highlighted when overlays representing potential activities were superimposed upon the regional framework maps. A further analysis suggested key issues to be addressed in decision-making on the future use and management of the region.

Data synthesis

The working group examined current government policies and various perspectives in regard to northern development. From this review, four questions about future directions were selected:

- Should new major industrial development be defer-

red until safer technology and greater understanding of environmental, social and economic relationships are available?

- Should parks and reserves be formally designated before new industrial development is allowed?

- Should shipping be expanded at this time to include year-round transportation of oil and gas?

- Should there be a determined program to explore and develop the resources of the Lancaster Sound region?

Phase Two: Public Review Process
The second phase of the Lancaster Sound Regional Study was recognized as an essential component of the development of the green paper. It began with two newsletters, circulated in January and May 1980. Informal northern community meetings by working group members in March and April 1980, familiarized the residents of Lancaster Sound with the study organization, its purpose and process. An information brochure, released in the fall of 1980, initiated the public review process on a nationwide scale. A member of the working group visited the Inuit communities in the Lancaster Sound region during the fall and winter of 1980-81 to explain and discuss the documents associated with the study.

With the official release and distribution of the draft green paper in February 1981, all interested persons and organizations were given an opportunity to discuss the issues and possible directions for the future of the Lancaster Sound region. Community meetings were held in Arctic Bay, Grise Fiord, Pond Inlet, and Resolute in April 1981 to provide a forum for discussion by the residents of the region. These meetings were chaired by H.J. Dirschl, who was accompanied by members of the working group.

During May 1981, workshops were held in Resolute and Ottawa to permit community representatives, public interest groups, industrial organizations and the general public to contribute to the discussion. The workshop at Resolute concentrated primarily on regional issues, whereas the Ottawa workshop had a wider, national focus. Both workshops were chaired by Peter Jacobs, Vice Dean of the Faculty of Environmental Design, University of Montreal. Professor Jacobs' report was distributed in draft form to the working group and to workshop participants for information. It is being published in English, French and Inuktitut as part of the documentation of the Lancaster Sound Regional Study.

Phase Three: Preparation of the Green Paper
The third phase of the Lancaster Sound Regional Study included refinement and modification of the draft paper on the basis of input received through the public review process. New data and corrections have been incorporated into the data atlas and amendments made to the regional framework and the potential activities described in the draft green paper. A clearer description of the issues has been possible and a set of planning considerations has been identified. Resource-use options and alternative arrangements for planning and management were developed to facilitate concrete planning and decision-making steps for the future of Lancaster Sound.

Appendix E
Supporting Documents

A. The **data base** for the Lancaster Sound Regional Study consists of the following documents:

1. A data atlas of 83 thematic maps at scale 1:2 million with map titles and legends in English, French, and Inuktitut. Descriptions (also in the three languages) for each map outline relevance to the study, key information presented, and quality or completeness of the data.

Data Maps

1.1 Geology
1.2 Earthquake Epicentres
1.3 Physiography
1.4 Coastal Geology
1.5 Coastal Geomorphology
1.6 Coastal Slope
1.7 Marine Sediments
1.8 Rivers and Lakes
1.9 Mean Annual Rainfall
1.10 Mean Annual Snowfall
1.11 Mean Annual Precipitation
1.12 Mean Surface Wind Roses
1.13 Mean Surface Wind Roses
1.14 Surface Water Circulation: Summer
1.15 Mean Tidal Range: Spring
1.16 Consolidated Ice Edges: 1964-1979
1.17 Median Ice Cover: May 28
1.18 Median Ice Cover: June 25
1.19 Median Ice Cover: July 23
1.20 Median Ice Cover: August 20
1.21 Minimum Ice Cover: August 20
1.22 Maximum Ice Cover: August 20
1.23 Median Ice Cover: September 17
1.24 Median Ice Cover: October 1
1.25 Median Ice Cover: October 29
1.26 Minimum Ice Cover: October 29
1.27 Maximum Ice Cover: October 29
1.28 Ice Drift: Winter
1.29 Ice Drift: Summer
1.30 Icebergs

2.1 Phytoplankton: Summer Standing Stock
2.2 Polar Bear: Winter
2.3 Polar Bear: Spring and Summer
2.4 Ringed Seal
2.5 Bearded Seal
2.6 Harp Seal
2.7 Walrus
2.8 White Whale (Beluga)
2.9 Narwhal
2.10 Bowhead Whale
2.11 Killer Whale
2.12 Colonial Seabirds
2.13 Fish
2.14 Vegetation
2.15 Arctic Fox
2.16 Muskoxen
2.17 Peary Caribou
2.18 Barren-Ground Caribou
2.19 Snow Goose
2.20 Birds

3.1 Communities
3.2 Tourism
3.3 Shipping: Corridors
3.4 Air Transport
3.5 Archaeological/Historical Sites and Bird Sanctuary
3.6 Hunting Pre-1974
3.7 Polar Bear Hunting
3.8 Walrus Hunting
3.9 Seal Hunting
3.10 Whale Hunting
3.11 Muskoxen Hunting
3.12 Caribou Hunting
3.13 Wildfowl Hunting
3.14 Fishing
3.15 Trap Lines
3.16 Mining
3.17 Oil and Gas: Permits

4.1 Tourism: Potential
4.2 Shipping: Potential Corridors
4.3 Shipping: Potential Marine Pollution: Winter
4.4 Shipping: Potential Marine Pollution: Summer
4.5 Air Transport: Potential
4.6 Parks Canada's Areas of Interest
4.7 Ecological Sites (IBP)
4.8 Mining: Potential
4.9 Sand and Gravel: Potential
4.10 Oil and Gas: Potential
4.11 Oil and Gas: Exploration
4.12 Oil and Gas: Potential Development
4.13 Oil and Gas Activities: Potential Marine Pollution: Winter
4.14 Oil and Gas Activities: Potential Marine Pollution: Summer
4.15 Representative Oil Spill Trajectories (a): Summer
4.16 Representative Oil Spill Trajectories (b): Summer
4.17 Sensitivity of Coastal Environment to Oil Spills

Background Reports

I. *Selected Physical Characteristics*
Geology and Physiography
Climate
Ice Climatology
Physical and Chemical Oceanography

II. *Selected Biological Characteristics*
Marine Life
Terrestrial Vegetation and Wildlife

III. *Socio-economic Characteristics and Conservation Interests*
A History of Human Occupation
An Overview of Socio-economic Conditions
Conservation Interests

IV. *Non-Renewable Resources and Transport*
Non-renewable Resources
Shipping

V. *Jurisdictions and Legislation*
A Review of International Rules, Federal and Territorial Legislation as it Relates to Use Options.

B. Documents pertaining to the **public review phase** of the study are as follows:

1. Report on the public review phase by the chairman, Peter Jacobs, entitled *People, Resources and the Environment - Perspectives on the Use and Management of the Lancaster Sound Region* (1981).

2. Formal verbatim transcripts of the workshops at Resolute and Ottawa:

T-01* P. Jacobs (Chairman), 1981.
Lancaster Sound Regional Study: Transcripts of Public Hearing Held in the Community Hall, Resolute Bay, N.W.T. Prepared by Nethercut and Company Limited. May 1981; Vol. 1 and 2; pp. 1-223.

T-02 P. Jacobs (Chairman), 1981.
Lancaster Sound Regional Study: Transcripts of Public Hearing Held at Carleton University, Ottawa, Ontario. Prepared by Nethercut and Company Limited. May 1981; Vol. 3, 4, and 5; pp. 224-646

*File reference codes as assigned by project office.

3. Open file of all formal submissions, letter submissions and material generated by the public review phase:

Formal Submissions

Reference Code	Name	Affiliation
S-01*	A.H. MacPherson	Department of the Environment (DOE)
S-02		Parks Canada, (DOE)
S-03	D. Daae	Norlands Petroleums Ltd. and Magnorth Petroleum Ltd.
S-04	G. Thompson	Inuit Tapirisat of Canada
S-05	J.P. Hea	Department of Energy, Mines and Resources (EMR)
S-06	C. Floe	Cominco Ltd.
S-07	J. Bonus	Mining Association of Canada
S-08	R. Pratt	Canadian Nature Federation
S-09	J. Britton	Government of the Northwest Territories
S-10	B.D. Bowie	Petro-Canada
S-11	D.I. Gamble	Canadian Arctic Resources Committee
S-12	H.G. Lawler	Department of Fisheries and Oceans (DFO)
S-13	E. Atkinson	University of Waterloo
S-14	D. Hodgson	Department of Transport (DOT)
S-15	B.M. Johansson	
	J.T. Stubbs	Dome Petroleum Ltd.
S-16	H.V. Page	Alberta Chamber of Resources
S-17	A.M. Pistruzak	Dome Petroleum Ltd.
S-18	C. O'Brien	
S-19	D. Dixon	Carleton University
S-20	V.F. Wetzel	Suncor Inc.

Letter Submissions

Reference Code	Name	Affiliation	Location
L-01	D. Bissett	Department of Indian Affairs and Northern Development (DIAND)	Ottawa, Ont.
L-02	I. Stirling	Canadian Wildlife Service (DOE)	Edmonton, Alta.
L-03	J. Loch	DFO	Winnipeg, Man.
L-04	H.J. Dirschl	DIAND	Ottawa, Ont.
L-05	A.J. Gaston	Canadian Wildlife Service (DOE)	Ottawa, Ont.
L-06	B. Wiesman	University of British Columbia	Vancouver, B.C.
L-07	R.F.B. Decaen	Union Oil Co.	Calgary, Alta.
L-08	J. Riddick	Polar Gas	Toronto, Ont.
L-09	R.B. Taylor	EMR	Dartmouth, N.S.
L-10	G.G. Runka	Land Sense Ltd.	Burnaby, B.C.
L-11	J.J. Straka	Shell Canada Resources Ltd.	Calgary, Alta.
L-12	N. Unrau	Mennonite Central Committee Canada	Winnipeg, Man.
L-13	T.R. Allsopp	Atmospheric Environment Service (DOE)	Downsview, Ont.
L-14	G.E. Cooper	Noranda Exploration Co. Ltd.	Toronto, Ont.
L-15	A. Ruffman	Geomarine Association Ltd.	Halifax, N.S.
L-16	R. Marois	National Museums of Canada	Ottawa, Ont.
L-17	E. Reimer	C-CORE, Memorial University	St. John's, Nfld.
L-18	B. Dixit	Dome Petroleum Ltd. (APP)	Calgary, Alta.
L-19	H. Fargey	Cominco Ltd.	Toronto, Ont.
L-20	B.R. Pelletier	EMR	Ottawa, Ont.
L-21	J. Loch	DFO	Winnipeg, Man.
L-22	E. Val	University of Waterloo	Waterloo, Ont.
L-23	R. Percey	DOE	Dartmouth, N.S.
L-24		IGALAAQ	
L-25	J. Riddick	Polar Gas	Toronto, Ont.
L-26	P. Ittinuar	Member of Parliament for Nunatsiaq	Ottawa, Ont.
L-27		Baffin Region Inuit Association	Frobisher Bay, N.W.T.

Reference Code	Name	Affiliation	Location
L-28	R. Popko		Cochrane, Ont.
L-29	D. Bosworth		New Hamburg, Ont.
L-30	C. Zarb		
L-31	S. Adams		Gananoque, Ont.
L-32	A.L. Collier	Canadian Coast Guard (DOT)	Ottawa, Ont.
L-33	C. Salisbury		Mississauga, Ont.
L-34	B. Seaton		Castlegar, B.C.
L-35	G. East		Greighton, Sask.
L-36	N. Parkinson		Chase, B.C.
L-37	R. Batt		Verdun, Que.
L-38	G. Willey		Caldwell, Ohio
L-39	G.W. Kirk		Truro, N.S.
L-40	A.H. MacPherson	DOE	Edmonton, Alta.
L-41	J.R.F. Hodgson	DOT	Ottawa, Ont.
L-42	J.P. Johnson Jr.	Carleton University	Ottawa, Ont.
L-43	J. Sprague	University of Guelph	Guelph, Ont.
L-44	T. Allsopp	Atmospheric Environment Service (DOE)	Downsview, Ont.
L-45	M. Randall	Canadian Labour Congress	Ottawa, Ont.
L-46	M. Amarook	Inuit Tapirisat of Canada	Ottawa, Ont.
L-47	R. Pratt	Canadian Nature Federation	Ottawa, Ont.
L-48	H. Fargey	Cominco Ltd.	Toronto, Ont.
L-49	J.D. Barry	Tourism Industry Association of Canada	Ottawa, Ont.
L-50	G.B. Clarke	Tourism Industry Association of Canada	Ottawa, Ont.
L-51	H. Williams	Manitoba Naturalists Society	Winnipeg, Man.
L-52	C. Stephenson	DOT	Ottawa, Ont.
L-53	J. McAdam	Prospectors and Developers Association	Toronto, Ont.
L-54	S.A. Kanik	DIAND	Ottawa, Ont.
L-55	S.A. Kanik	DIAND	Ottawa, Ont.
L-56	J.A. Carruthers	Parks Canada (DOE)	Ottawa, Ont.

Material Generated by the Public Review Phase

P-01 H.J. Dirschl (Chairman), 1981.
Resumé of Community Meetings in Resolute, Pond Inlet, Grise Fiord, and Arctic Bay. Kenn Harper, Rapporteur; 21 p.

P-02 P. Jacobs (Chairman), 1981.
Summary of Proceedings: Northern Workshop. Resolute Bay, N.W.T.; May 1981; Margaret Ault, Rapporteur; 20 p.

P-03 Department of Indian Affairs and Northern Development, 1981.
Background Material for Southern Workshop Participants. Lancaster Sound Regional Study; Indian and Northern Affairs Canada; 8 p.

P-04 H. Mills, 1981.
Summary Report: Work Group A. Southern Workshop, Lancaster Sound Regional Study; Ottawa; M. McComb, Rapporteur; 4 p.

P-05 R. Pratt, 1981.
Summary Report: Work Group B. Southern Workshop, Lancaster Sound Regional Study; Ottawa; K. Harper, Rapporteur; 7 p.

P-06 T. Garvin, 1981.
Summary Report: Work Group C. Southern Workshop, Lancaster Sound Regional Study; Ottawa; A.M. Ault, Rapporteur; 8 p.

P-07 P. Harrison 1981.
Summary Report: Work Group D. Southern Workshop, Lancaster Sound Regional Study; Ottawa; R. Engelhardt, Rapporteur; 2 p.

Single copies of individual reports and submissions - please indicate reference code - may be obtained by writing to:

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